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electron

user

Vol. 6 No. 7 April 1989 £1.25

Painting with Patterns

Fill your
screen
with
colour

*Protect your programs with
error trapped input routines*

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PLAY IT AGAIN SAM

701

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FOR THE
ELECTRON

FIRETRACK

FIRETRACK
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Micro's first game featuring an
intelligent alien "Firetrack" and
his crew who breathe fire and
shoot a path with missiles of
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the player an exciting game
with beautifully rendered
graphics. It's the BBC Micro and a
must-have for the serious
gamester for the Electron.

A
Superior
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BONE GRUNCHER

BONEGRUNCHER
Superior's Rasmus
Todd Owen
plays the part of Bone, a green
toothed dragon who collects skeletons
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giants.
Seen enough four-directional
scrolling and other familiar
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change game pieces of the
game. A real winner for the
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SNAPPER

SNAPPER
Acornsoft's Acornsoft Classic
reproduction of the popular
recreation game. Acornsoft have
recreated the game with a more
realistic and more enjoyable
game. Acornsoft's Acornsoft
Classic is a must-have for the
serious gamester for the
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GHOULS

GHOULS
Micro Power's Ghoulies is
an intense and exciting game set
in an ancient Egyptian tomb.
Create an ancient Egyptian
game of a maze. The
game is a must-have for the
serious gamester for the
Electron. A & B Computing
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PLAY IT AGAIN SAM 7 for the BBC Micro and Acorn Electron

Superior Software has combined three classic hits from other software houses (one new to the Electron) with one of its own top hits. The result is a top quality four-game compilation that combines variety with great value for money.

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(The screen pictures show the BBC Micro versions of the games.)

PLAY IT AGAIN SAM COMPETITION

Each copy of Play It Again Sam 7 contains a PLAY IT AGAIN SAM COMPETITION CARD.

Answer some straightforward questions on the card about previous Play It Again Sam compilations, and suggest possible games for future compilations, and you may be one of ten prizewinners.

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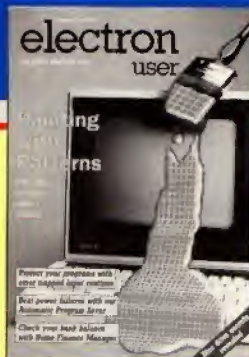
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Back to school

10 educational
games for the
Electron for just £5.95

Write your own arcade smashes using the

ARCADE GAME Creator

ArCADE GAME Creator is a suite of programs for the Electron and BBC Micros. Taken from the pages of *Electron User*, it lets you into the secrets of writing fast-action arcade games, and provides you with a number of utilities to make design and programming easier.

Among the programs are:

- A Mode 5 sprite editor that lets you design your own multi-coloured characters.
- A selection of fast print routines that will move sprites both in front or behind other objects on the screen.
- Map generators that will squeeze a Mode 5 screen into 8 bytes!
- Scrolling maps.
- Score update and printing routines.
... and much, much more.

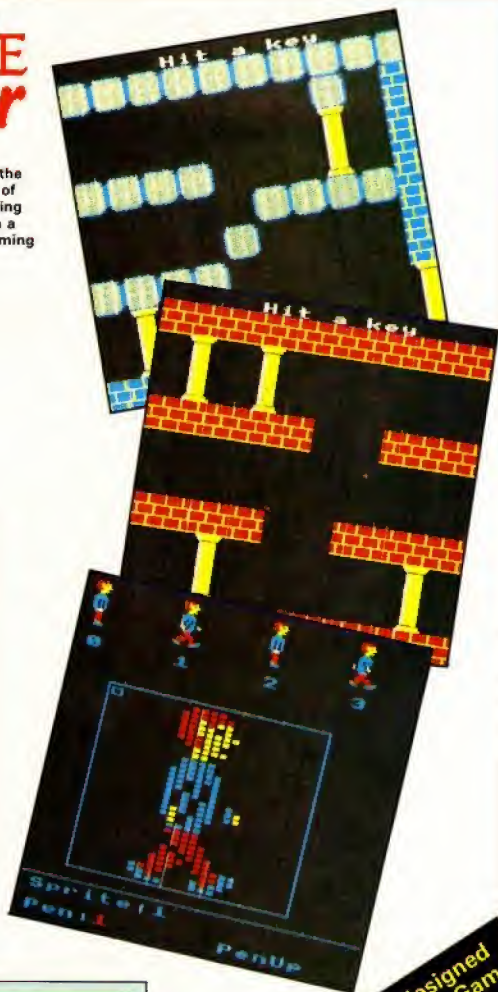
To help you make the most of the Arcade Game Creator, you will also get a comprehensive manual based on the original series.

Written in an easy to read style and with many illustrations and screen shots, it contains all the information you need to create and animate sprites, to design backgrounds and to link the two together into a complete arcade game.

If you are an aspiring games programmer, this is an offer you simply cannot afford to miss!

ArCADE GAME Creator

Tape + manual£9.95



Screens designed
using Arcade Game
Creator

TO ORDER PLEASE USE THE FORM ON PAGE 45

electron user NEWS



In real life, Brian Clough's football career has been taking some knocks but the computer game Brian Clough's Football Fortunes is going from strength to strength.

Sales have already topped the 80,000 mark and CDS Software (0302 321134) has now re-released it on the Electron and other formats predicting that it will break the 100,000 barrier. Price £7.99.

Seminar on DTP

MORE people are turning their Electrons to desktop publishing with the availability of AVP's Pixel Perfect and Stop Press from Slogger. For them, riding the new wave of DTP is comparatively easy, but for novices who launch into buying a new system, it can be a lonely road.

A recent survey has revealed that DTP users are far from happy with the technical support they get from dealers. Sixty per cent of people attending a DTP seminar run by Dryx Systems at Hever Castle, Kent, said that while they were satisfied with the systems they had bought, they were certainly not satisfied with the back-up service from dealers.

The reason is that most DTP suppliers do not have the necessary specialist knowledge.

Dryx is a specialist supplier in the DTP field. Its marketing director Roger Smith said: "The need for specialist DTP suppliers was never more apparent and yet is sadly lacking. We're hoping that the seminar and the survey findings will give potential users more encouragement when considering DTP. At the moment, it threatens to be somewhat of a nightmare to them".

Sexy Barbarian II back in the fray

IT has been dubbed a storm in a D-cup, but the furor over sexy advertising for the first version of Barbarian is starting again with Barbarian II, for which an Electron version is now out.

Packaging, posters and advertising shots of the Barbarian and his sparsely clad mate, model girl Maria Whittaker, were rapped by members of the public, censored in publications and banished from sales shelves when Barbarian I was launched. But others found advertising for the Palace game inoffensive and the Advertising Standards Authority said it contravened no advertising codes.

Superior Software (0532 459453) has now done the Electron conversion of Barbarian I and some Electron users are girding their loins to do battle.

A reader from Solihull writes: "May I take this opportunity to beg Superior not to use the same



style adverts to promote this product. I refused to buy the original Barbarian because the inlay was so embarrassing and from what I have seen so far, the adverts and inlay are even worse

in the sequel.

"Please, Superior, reconsider the advertising campaign while you still have the chance or I'm afraid you will lose out on my custom again, no matter how good the game is".

Superior's Steve Hanson said: "There were originally three objections - the lack of clothing, the fact that the woman was draped over the man and the man's dominance over the woman in the game.

"Two of these objections no longer exist because in the new game the player can take the part of either the Barbarian or Mariana. In the advertisements, they are not touching but they are still loosely clad.

"We need to use this advertisement to make it plain that we have done a version of the Palace game. If we changed the advertising it could cause confusion".

CDS Software (0302 321134) has released an Electron version of its new interactive computer board game Tankattack.

It is for two, three or four players who take the roles of generals commanding a tank corps.

The object is to either capture enemy headquarters or annihilate all enemy forces.

Price £12.99.

Cue for a new game

FLASH Harry, Mighty Mike, Catford Kid and Fast Freddy are the opponents in 3D Pool, the latest sport simulation game from Firebird (01-631 5206).

Just released on the Electron, 3D Pool has been endorsed by the current UK and European pool champion, Maltese Joe Barbara. It incorporates a "move round the table" feature allowing shots to be played from any position and you can spin the ball

just like in a real game.

The Electron version has been programmed by Nick Pelling of Aardvaark Software. Price £8.99.



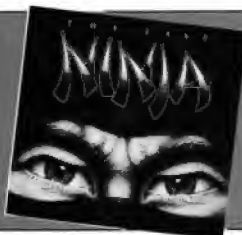
We show Russians the way

TDP Russian biffins have asked Electron User to help them find what's best in the West on the science and technology front.

The Institute of Scientific Information at the USSR Academy of Sciences publishes an Abstracts Journal and wants a copy of Electron User to provide some editorial ideas.

In the true spirit of glasnost we'll soon be despatching the latest issue to Moscow to show them the secret of success.

Gallup Software Chart



THIS MONTH	LAST MONTH	TITLE (Software House)	COMMENTS	PRICE
1	▲4	SMASH AND GRAB <i>Blue Ribbon</i>	Making a second and successful bid for the top, give this budget title a go if you are feeling especially villainous. Nothing new, but very playable.	1.99
2	▼1	FRANKENSTEIN 2000 <i>Atlantis</i>	Knocked from its premier position is this mixture of Inner Space, Fantastic Voyage and things that go bump in the night. Well worth the money.	1.99
3	▲16	CREEPY CAVE <i>Atlantis</i>	Yes you've done it again - lost your key. But this time it has been found by a mischievous ghost which entices you into the caves to retrieve it.	1.99
4	●	TRIPLE DECKER <i>Alternative</i>	These games were originally listings in <i>Electron User</i> and <i>The Micro User</i> . There can be no argument about their value for money.	1.99
5	▼3	JOE BLADE 2 <i>Players</i>	The graphics are excellent and the game very playable. The puzzle screens are difficult, but this superb sequel will keep you busy for hours.	2.99
6	◀6	COMMANDO <i>Encore</i>	Excellent value and one you should certainly add to your collection if you have not already done so. This shoot-'em-all is just what you would expect.	2.99
7	▲10	CITADEL <i>Blue Ribbon</i>	The highest Superior/Blue Ribbon release of an originally full-priced title. A great way to start a collection if you are new to the Electron.	2.99
8	▲9	STRYKER'S RUN <i>Blue Ribbon</i>	Another of the old Superior titles under a new badge. Well worth buying this arcade adventure - and also its sequel, Codename: Droid.	2.99
9	▼7	LAST NINJA <i>Superior</i>	The highest full-priced new title in the chart this month. An excellent game if you ignore the historical inaccuracies. Nice graphics and very enjoyable.	9.99
10	●	GRAND PRIX <i>Alternative</i>	If you have a craving for the good life complete with fast cars don your helmet and prepare to zoom around the track in this racing simulation.	1.99
11	●	RAVENSKULL <i>Blue Ribbon</i>	A really excellent arcade adventure which was a classic on its original label, and at this price it must be a bargain.	2.99
12	▲14	CHUCKIE EGG <i>A&F</i>	Enter the chicken house and join this ladders and levels game. Fall and you'll be scrambled. Avoid disaster and collect all the riches you could want.	9.95
13	●	ANARCHY ZONE <i>Atlantis</i>	Back to outer space and your chance to save the Earth from imminent peril. An addictive shoot-'em-up which you will keep coming back for more.	1.99
14	●	GRAHAM GOOCH TEST CRICKET <i>Alternative</i>	Although cricket is becoming less seasonal there is very little available for the cricket enthusiast in winter. Different but not much graphically.	1.99
15	●	JOE BLADE <i>Players</i>	Back in the charts is the original mission for Joe Blade. Both games are excellent and you should certainly buy both.	1.99
16	▼8	EXILE <i>Superior</i>	There is a massive cave system to explore and it will keep you busy for days at a time. Very different from anything else in the charts.	12.95
17	▼5	VIDEO CLASSICS <i>Firebird</i>	A budget collection of some simple and fun games. This title keeps reappearing in the charts. Definitely cheap and cheerful.	1.99
18	●	PLAY IT AGAIN SAM 5 <i>Superior</i>	This time Superior gives other software houses a chance. Features Imogen, Moonraider, Elixir and Bug Blaster.	9.95
19	●	SNAPPER <i>Acornsoft</i>	A blast from the past here though I would wait for Play it Again Sam 7, as for the same price you get three other games too.	9.99
20	●	STEVE DAVIS SNOOKER <i>Blue Ribbon</i>	Yes, he's back again. If you are a snooker enthusiast you will probably have this already. This game refuses to retire.	1.99

SOFTWARE

Bargains

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PLAY IT AGAIN SAM (Clashed, Thrust, Skykara Run, Ravenskull)	C	5.95	4.95
PLAY IT AGAIN SAM 2 (Planet 3, Cruise Rider, Galactica, Codename Droid)	C	5.95	4.95
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PLAY IT AGAIN SAM 5 (Smogger, Big Brother, Moonraider, Elit)	C	5.95	4.95
PLAY IT AGAIN SAM 6 (Galactica 2, Hunchback, Hopper, Viper's Revenge)	C	5.95	4.95
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Function keys on parade

OUR first 10 Liner this month comes from Neil Cunningham of Girvan, Ayrshire, who has solved the problem of displaying the contents of the function key definitions.

It's easy to forget what we have programmed on each of the 15 keys, so this handy procedure - which can be tagged on to the end of any listing - will tell you whether any keys have been used, what each definition is, which are still vacant and how many bytes of free memory you've got.

To use the routine simply type PROCkeys and the contents will be displayed on the screen. It works by examining the function key buffer - one page of memory starting at &800.

```

1 REM *KEY viewer By Neil Cunningham
2 PROCkeys:END
3 DEF PROCkeys
4 FOR a%=800 TO 807:st="6801:st=
st:FOR b=800 TO 807:IF a%>7&b AND 7&
<c% THEN st=st&
5 NEXT
6 j%=7&a+6&b:PRINT "KEY ";a%-800;
D:TAB(8):IF b%>7&b THEN COLOR15:COLOR7
:GOTO 1
7 REPEAT IF j%>31 AND 7j%<127 PRINT
TAB$(7j%):
8 IF j%>0 AND 7j%<32 THEN PRINT:"
":CHR$(7j%+64):
9 j%=j%+1:UNTIL j%<7&b:IF 7j%<1
3 AND 7j%<6&b:PRINT"IM":
10 NEXT:PRINT "Spare bytes for fu
nction keys = ":a%-st:ENDPROC
  
```

```

*KEY 0 *EXEC IBoot
*KEY 1 CLEAR:RENUMBER:MMODE 3:MLIST:M
*KEY 2 MODE 6:M:S0400LIST:M
*KEY 3 *W.:M
*KEY 4 PRINTER DRIVER:M
*KEY 5 LOAD"
*KEY 6 SAVE"
*KEY 7 PROCkeys:M
*KEY 8 *WIPE *.*:M
*KEY 9 VACANT
*KEY 10 VACANT
*KEY 11 VACANT
*KEY 12 VACANT
*KEY 13 VACANT
*KEY 14 VACANT
*KEY 15 VACANT
  
```

Spare bytes for function keys = 135

Number printer

OUR second 10 Liner is from Janice Murray of Warrington, Cheshire, who has provided a clever routine that will output any number in any number base. To use it all you have to do is type:

```
PRINT FNprint(number,base)
```

where *number* is the number you want to print out and *base* is the number base.

The routine works by successively dividing the number by the base. The remainders are converted into Ascii characters - 0 to 9 or A to Z - and then stored in reverse order in a string. (You can't print the digits out as they are calculated because the number will come out backwards - try it and see.)

When the quotient eventually reaches zero the calculation is complete and the function ends, returning the string containing the number - now the correct way round.

```

1 REM Print any number in any base
2 INPUT "Enter a number:"n% : INPUT
T "Enter the base:"b%
3 PRINT FNprint(n%,b%):END
4 DEF FNprint(number%,base%)
5 number%=n%
6 REPEAT remainder=number% MOD ba
se%
7 IF remainder<>0 THEN remainder=
remainder/b%
8 number%=CHR$(40+remainder%)*num
ber%:number=number/INT base%
9 UNTIL number=0
10 =number%
  
```


Spider's web

MATHEMATICS is a fascinating topic and *Electron User* has revealed some of many interesting ways in which it can be explored. Here is yet another way to investigate the relationship between numbers.

This short program from Janice Murray asks you to enter two whole numbers, which must be in the range 1 to 359. It then performs a few simple calculations on them and displays the results graphically.

The output from the calculations can produce beautiful displays of regular figures reminiscent of the sort of pictures you can

make with that old children's game Spirograph. The illustrations show the sort of results you can expect.

The only problem is that when you enter the two numbers you don't know what you're going to end up with - it could be a beautiful pattern, or a simple scribble. What you must do is experiment with pairs of numbers and discover the patterns for yourself.

There are thousands of patterns to be found. Here are just three that we know of: Enter 4 and 43 at the prompts, or try 5 and 97, or 288 and 71.

```
10 MODE 4:PRINT:VDU 29,640,512:
20 INPUT "1st number":n1
30 INPUT "2nd number":d1
40 a1=0:oldc=0:oldy=0:FN=500
50 REPEAT
60 a1=(a1+d1)MOD 360:x=RAD((n1*a1)/M
OD 360):y=SIN(x):t=RAD(a1)
70 newc=r*SIN(t):newy=r*COS(t)
80 MOVE oldc*FN,oldy*FN:DRAW newc*F
N,newy*FN
90 oldc=newc:oldy=newy
100 UNTIL a1=0
```

What's my name?

OUR fourth mini program this month is a utility which enables you to save your programs to tape with constantly changing filenames and is from Richard Bates of Burntwood, Staffordshire.

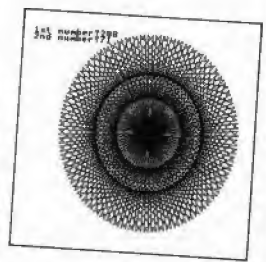
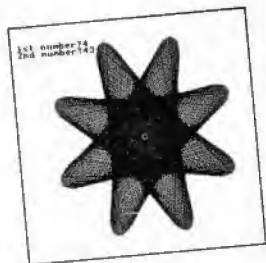
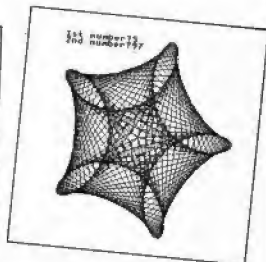
You see this effect quite often with commercial software, but until now it wasn't possible to do this with your own files.

To use it enter the listing, storing your two filenames in lines 60 and 70 in place of ELECTRON and electron. Load the program you want to save, then type *FX14.4 to enable the interrupt-driven code. Save your program under any name - it will be replaced by the two in the machine code listing. After saving it type *FX13.4 to disable the routine.

Don't worry about loading the program

afterwards, just use the first filename and load it as normal. You don't need to load and run the utility at all.

```
10 code=6800:FOR pass=0 TO 2 STEP 2
:PI=code:{ OPT pass
20 FFP:PIA:IOA:IOB:PIA:IOA:PIA:LDY #0:L
DA 43C6:LSR A:BCS name1to
30 name1to LDA name1,Y:STA 43D2,Y:
BEQ end:INY:JMP nameone
40 name2to LDA name2,Y:STA 43D2,Y:
BEQ end:INY:JMP nametwo
50 end PIA:TRY:PIA:IOA:PIA:PLP:RIS
60 name1 EQU$ "ELECTRON":BRK
70 name2 EQU$ "electron":BRK
80 J-BRKT
90 74220=code MOD 256
100 74221=code DIV 256
```



Go for a scroll

WE have published several text scrolling utilities in the past. However, this one from Andy Richards of Chester is slightly different in that it scrolls the text up the screen. You are first asked to input a string of text and then the program calls the procedure PROCscroll.

A plain block is defined as character 255 and the bit pattern for every character in the string is found by calling OSWORD 10. A block is printed for every bit set, and because printing takes place on the bottom line of the screen it will scroll up - producing the animated scrolling effect.

```
10 MODE 4:PRINT:TAB(0,5)"Scrolling
messages":TAB(0,9):"EX16
20 INPUT "Enter text:"t$
30 PROCscroll(t$)
40 END
50
60 DEF PROCscroll(t$)
70 VDU 23,255,255,255,255,255,2
55,255,255:A=10:X#=670:Y#=0:REPEAT 74
70=ASC(t$):CALL SPPY1
80 FOR J#=0 TO 7:a$=""FOR K#=7 TO
0 STEP -1:IF 2*K# AND J#%71 a$=a$+CHR
(255 ELSE a$=a$+"
90 NEXT:PRINT TAB(0,31):a$:NEXT:t$=
MID$(t$,2) UNTIL t$=""
100 ENDPROC
```

Don't miss out on the mass of material that's appeared in *Electron User* over the past few months. Bring yourself up to date with this back issue bundle, packed with games, utilities, features and programming tutorials.

**Here's what you'll find in the
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HERE are some interesting routines for inputting data into your micro - Basic listings that are alternatives to the standard built-in INPUT function. Many pitfalls await people writing foolproof programs designed to be used with novices and this article will highlight some problems and show how they can be solved.

You won't find many commercial programs using INPUT to enter information, like your name into a game's high score table. To see why this perfectly ordinary function is best avoided enter and run Program I:

```
10 REM Program I
20 CLS
30 PRINT TAB(0,5):
40 INPUT "Enter a letter:":L$
50 PRINT
60 PRINT "You pressed the ";L$;" key"
70 END
```

Program I

At first sight it seems quite reasonable. It asks you to enter a letter, and on tapping a key and pressing Return the program prints out the letter you pressed. However, there are hidden dangers. Place yourself in the position of a young child or novice and see what happens.

Julie Boswell presents a host of Basic input routines designed to cope with all your programming ploys

For instance, you can hold down a key and the keyboard's auto repeat fills about six screen lines with the letter pressed. Not only could this wipe out a picture you had carefully drawn on screen, but also your Electron frantically beeps at you when the keyboard buffer is full.

Even worse problems can occur. Run the program again and at the prompt press Control+S followed by 08000 and you'll see the whole screen start to flash black and white. You can even change mode with Control+V followed by 0, 1, 2 and so on. This may cause a long listing to have its tail end completely wiped out making the program crash.

How can these faults be prevented? The solution is to throw out the INPUT function and use GET instead: Program II is a modified

version of Program I. Enter and run this:

```
10 REM Program II
20 CLS
30 PRINT
40 PRINT TAB(0,5)"Enter a letter:":
50 L$=GET$
60 UNTIL L$="A" AND L$="Z"
70 PRINT L$
80 PRINT "You pressed the ";L$;" key"
90 END
```

Program II

Try crashing it with the techniques mentioned above - they don't work do they? The program stubbornly refuses to accept anything but a single letter. The only problem you are likely to encounter is that unless the Caps Lk light is on the program will not accept the letter. To get around this change line 50 to:

```
50 L$=CHR$(GET AND 63F)
```

What this does is ensure that bit 32 is clear - which is true for all upper case letters. So even if Caps Lk is off and you enter a lower case letter it will be automatically converted and accepted.

You might think this is the end of the story, but I have only just scratched the surface of this fascinating topic. What we have done is to write an error-trapped idiotproof routine to input a single letter from the keyboard. The next stage is to enter a whole word - and that's a little more tricky.

We have to input characters repeatedly from the keyboard until Return is pressed. In the previous example GET\$ was used to read the characters, but this time the Ascii code of the key pressed is read. It can then be tested to see if it lies within a particular range, and anything outside this can be rejected.

Enter and run Program III. Type a short word and press Return afterwards:

```
10 REM Program III
20 CLS
30 a$=""
40 PRINT TAB(0,5)"Type a word:...."
50 a$=GET$
60 PRINT
70 IF a$<31 AND a$>127 AND LEN(a$)<5 THEN a$=CHR$(INT(a$)):GOTO 40
80 IF a$<31 AND LEN(a$)>0 THEN a$=LEFT$(a$,LEN(a$)-1):GOTO 40,46,9
90 UNTIL a$=""
100 PRINT
110 PRINT "You typed: ";a$
120 END
```

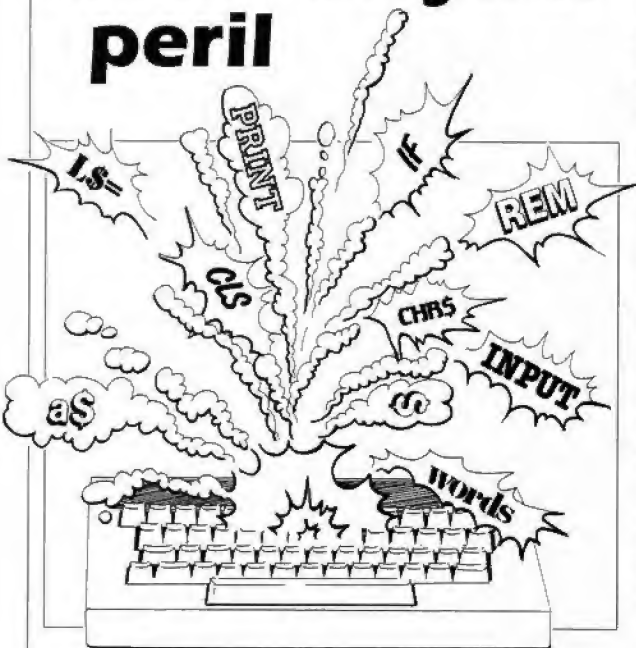
Program III

Note that this example contains a number of advanced input features. For instance, it is completely error trapped so that the keys producing the effects outlined at the start of the article will be thrown out.

Also the maximum length of the word you can type is limited to five letters. Line 70 is responsible for this, and you can alter the length by changing the 5 in this line to whatever length word you require. The number of letters is indicated by a row of dots - one for each character - so if the length of word expected is altered you'll have to alter the number of dots to correspond to the new

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Enter at your peril



◀ From Page 11

length.

In addition to all this, you can delete typing errors by tapping the Delete key too. Line

```

10 REM Program IV
20 CLS
30 a$=""
40 TAB(0,10) "Type a word: . . .
";
50 PRINT TAB(1,10);
50 REPEAT
60 PROCmusic
70 key$=INKEY$
80 IF key$>31 AND key$<127 AND LEN(a$)
<5 a$=a$+CHR$(key$):VDU key$
90 IF key$=127 AND LEN(a$)>0 a$=LEFT$
(a$,LEN(a$)-1):VDU 8,46,8
100 UNTIL key$=13
110 PRINT
120 PRINT "You typed: ";a$
130 END
140
150 DEF PROCmusic
160 IF ACVAL(-6)=0 ENDPROC
170 REPEAT
180 READ P#
190 IF P#<0 RESTORE
200 UNTIL P#>-1
210 SOUND 1,-15,P#,5
220 ENDPROC
230
240 DATA 52,60,68,72,80,88,96
250 DATA 100,96,88,80,72,68,60
260 DATA -1
    
```

Program IV

80 checks for Ascii 127 and chops off the last letter of the word entered in a\$, providing of course, there's one to chop off.

We can make further enhancements to this basic input routine. Program IV, for instance, plays music while you enter the word at the keyboard:

This is quite an attractive feature to build into arcade games – there's nothing more dull than a program sitting there waiting for you to enter your name, so why not brighten it up with some lively music?

```

10 REM Program V
20 CLS
30 PRINT TAB(0,5) "How many words can
";
40 PRINT "you make from ELEPHANT?"
50 REPEAT
60 word$=FNinput("ELEPHANT")
70 PRINT
80 UNTIL FALSE
90 END
100
110 DEF FNinput(t$)
120 a$=""
130 REPEAT
140 key$=GET
150 IF INSTR(t$,CHR$(key$)) AND LEN(a$)
<LEN(t$) a$=a$+CHR$(key$):VDU key$
160 IF key$=127 AND LEN(a$)>0 a$=LEFT$
(a$,LEN(a$)-1):VDU 127
170 UNTIL key$=13 AND LEN(a$)>0
180 a$
    
```

Program V

The changes required are minor. The GET has been replaced by an INKEY\$ and a call to PROCmusic has been replaced within the REPEAT ... UNTIL loop. The only point to watch out for is that when the sound buffer is full all processing will stop, and that includes reading the keyboard. So the first task of PROCmusic is to make sure there is a space in the sound buffer to enter the next note, and if there isn't, the procedure ends without doing anything.

The final input routine we'll look at is one which restricts what you can enter to a pre-defined list of characters. Enter and run Program V:

Here a function called FNinput is used to accept input from the keyboard. Only those characters contained in the string passed as a parameter can be entered and everything else is rejected. It works by checking every character typed against the set string using the INSTR function.

The program asks you to make up a number of words using only the letters contained in Elephant – an old puzzle. It's main function here, however, is simply to show how input can be restricted to certain characters.

In this example it would be best, if after using a letter once, you could not use it again. It only requires a simple modification to the listing, but having shown you the way I'll leave that puzzle for you to solve. (Hint: You'll have to use string slicing to chop the letter entered out of a\$).

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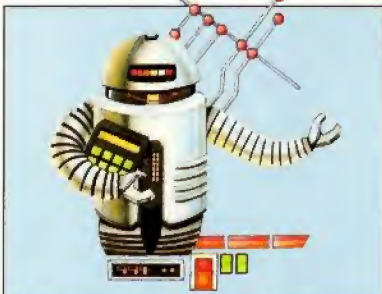
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Holed



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OUT !!

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Using a 7 iron to clear the trees.



A good lie in the rough but there's a strong wind.



A long put with a tricky slope to the left.



A long bunker shot soars through the air to the green.



A left-handed player aims to clear the canal with a 3 Wood.



A high Wedge shot from a bad lie in the rough.



The Electron version is identical to the BBC version.

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PLAY IT AGAIN SAM 6



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THIS is the sixth package in the very popular Play it Again Sam series. Superior seems to be turning out these polished compilations at a rate of about one a month. The pack contains four great arcade games, two golden oldies and two newcomers.

The first title is **Hunchback**, a classic from the early years of arcade machines. In it you take the part of Quasimodo and you must scale the battlements of a castle to rescue your beloved Esmeralda.

You start off on a flat wall and as you run across from one side of the screen to the other a boulder flies towards you. A quick tap on the Return key and you safely leap over it. As you reach the other side the screen flicks to reveal the next.

Here a pit bars your way and you must run, jump and grab a swinging rope in order to cross it Tarzan style. On to the next screen. Now there are small pits that can be jumped with a single bound. However a boulder flying towards you must also be dodged.

The next screen features guards with spears who stand in pits and attempt to jab you where it hurts as you leap over them. And so it goes on. There are three levels and eight screens to negotiate and you practise by opting to start on any particular screen.

The graphics are excellent, but the sound is sparse. I found it to be highly entertaining and frustrating, having that "just one more go" addictiveness.

Hopper dates back to the earliest days of the Electron. The idea is to guide a frog across a busy road, over a dangerous river to your home pond, all within a time limit. As you progress through the levels the amount of traffic on the road increases and dodging the vehicles becomes more difficult.

You must be the only frog that can't swim, for when you cross the river you mustn't fall into the water. Floating logs can be used to step safely across, and you can ride on the backs of swimming turtles - watch out as

they occasionally dive and you fall into the water and drown. Crocodiles patrol the river and their favourite snack is frog.

There is little depth to the game compared to many recent arcade adventures, but in spite of this it's fun to load up and play every now and then.

Galaxforce 2 is the sequel to one of the best shoot-'em-up Galaxians type games ever seen on the Electron. The action is fast and furious as aliens stream on to the screen, swirl round and let loose showers of missiles.

Armed with your trusty laser base you wipe out wave after wave. Movement is mainly left and right, but some up and down leeway is permitted, allowing you to go get 'em rather than waiting for them to come to you.

Capsules drop down the screen every now and then and these can be collected to provide you with extra firepower and more lives. The graphics are superb.

Finally in this compilation comes **Video's Revenge**, a sort of Planetoid set on its side. You are in control of a ship flying through space and hordes of aliens fly down the vertically scrolling screen. Needless to say, all are hostile and shoot carefully aimed missiles in your direction as they approach.

You can see what's coming by taking quick



Galaxforce 2 is an impressive sequel to the original



Hopper was an early arcade hit

peeks at the long range scanner which runs down the right hand side of the screen. On this each alien is represented by a blob so you can't tell the type of enemy craft.



Video's revenge is like Planescape placed on its side



Hunchback is an old favourite

Some aliens are like seed pods which crack open when shot releasing half a dozen tiny craft. These little blighters can be quite a handful as they require a perfectly aimed missile to dispose of them.

Extra features are available in the form of an invisibility cloak and smart bombs. By blasting an enemy balloon 12 times and catching the energy pod released your firepower increases threefold.

Overall, Play it Again Sam 6 is yet another winner. The games work out at just under

£2.50 each, which can't be bad. The quality is excellent, and though two of the games are re-releases of old titles, they are still fun to play. Recommended.

Roland Waddilove

Sound	8
Graphics	9
Playability	10
Value for money	10
Overall	9

Second Opinion

Another superb compilation from the Superior stable. Every game is addictive and fun to play. The only problem is that I've already got the two re-releases. However, even discounting these, the other two still work out at under a fiver each, which can't be bad. I like it – and think you will too.

Janice Murray

The new masterpiece

Product: *Exile*
Price: £9.99 (tape)
Supplier: Superior Software, Regent House,
Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453



THE Pericles was on her 500th tour of duty, her mission to seek out new planets and boldly go where no man has gone before. Unfortunately it wasn't the first visitor to the planet Phoebus. Fifty years before its arrival Triax, a psychotic genetic engineer, crash landed on this planet inhabited byimps and maggots... and continued his warped experiments.

You play the role of Finn, the Dirty Harry of the Columbus Force, who has been assigned to investigate the mysterious events on Phoebus. Your objectives are to overpower Triax and destroy his mutant maggot production line before they set course for Earth and wreak their revenge on mankind.

A well-written novella graphically depicts the gory demise of each member of the Pericles' crew, but provides no major clues to aid the player as he pits wits and reflexes against this, the arcade/adventure to beat them all.

Due to the size of the game, the vital save options are handled by the initial loader pro-

gram which provides all of the usual facilities that you would expect from a top notch adventure.

The story begins as you enter geostationary orbit above the planet Phoebus. Behind you a green spectral figure materialises momentarily then vanishes. Minutes later you discover that your ship's Destinator has dis-



appeared and without it your craft is useless.

Donning space suit and jet pack you prepare to jump to the surface below, if only you could unlock the ship's hatch. A brief exploration of the cabin reveals the presence of a switch which, when kicked, unlocks it.

Stepping out into the blackness you fall gently on to a cross-sectional view of the abandoned Pericles. Several useful looking items can be seen inside the ship, but every hatch is locked and there are no handy switches nearby.

Leaping from the ship to the ground you wander towards an opening. But as you approach, a hamburger-shaped device attached to the underside of the ship swivels around and bowls you over with a few well-placed blasts from its stun gun.

At this point you decide that it would probably be safer to explore the planet's surface instead. Heading in an easterly direction you catch a few tantalising glimpses of goodies beneath the ground – courtesy of the cross-sectional viewpoint.

On the surface is a small bush, home of the most irritating canary you've ever encountered. This feathered foe isn't harmful, but it follows you everywhere pushing you down

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holes and into the firing line of the trigger-happy hamburger.

With experience I discovered you could pass the bird undetected by flying at altitude and landing on the far side. Here, hidden in a bush, you discover your first hand grenade.

Returning to the ship you decide to take your chances against the Big Mac blaster. Running towards the pit you suffer several hits, but manage to leap into the abyss and thrust out of range, only to find your way barred by a locked door. Remembering your grenade you drop it on the door, run to one side, and lay flat on the ground – this evasive action is most important as you'll be caught by the blast if you remain standing. The beeps of the primed grenade are followed by a bang and an open gateway to the underworld.

Thanks to the in-built intelligence of your spacesuit, death is an infrequent occurrence. Whenever it feels that your lifeorce is dan-

gerously low it teleports you back to a previously chosen position – if you haven't remembered a position you are returned to your ship. Remembering is something that should be done every time you find a safe, alien-free, area of cave. By pressing *F* you can store up to four separate locations in your suit's memory.

The caverns of Phoebus are home to a wide variety of imps, maggots, wasps, birds and an impressive selection of robots, many of which are armed with homing missiles. In addition there are natural barriers such as strong winds, water and inertia.

Exile's detailed graphics enhance the game's infuriating puzzles beautifully. Every-

Sound	8
Graphics	8
Playability	8
Value for money	8
Overall	8

thing is drawn on a small scale, thereby emphasising the vastness of the underground complex. The animation is fast and incredibly realistic – I marvelled at the way Finn was bundled head over heels by a blast from the stun cannon.

Jon Revis

Second Opinion

Exile is a massive arcade adventure in the Citadel tradition. You must map out dozens of locations, find objects, use them in the right places and solve mind-bending puzzles.

What spoils the game for me is the very jerky scrolling – at times your character leaps all over the screen. It's a pity as Exile would otherwise have won Electron User's coveted Golden Game award.

Janice Murray

Antidote to poison

*Product: Orbital
Price: £4.95 (tape)
Supplier: Impact Software, Neepsend House,
1 Percy Street, Sheffield S3 8AU.
Tel: 0742 789950*

FOLLOWING the great success of Clogger and Zenon, Impact has produced a neat little game called Orbital and while it is by no means a future classic, it does have quite a lot going for it.

It's simple to play but is difficult enough to keep you interested and entertained. The idea is that you move Ozzie the Orbital around the 12 tiny worlds that make up the home of the deadly Octopodes.

The fact that these worlds appear to be made up of building blocks is a bit disconcerting at first. But you don't really worry about that as you only have a limited amount of time to move around, collecting the plutonium marbles which are liberally sprinkled about. The marbles have been created by the Octopodes in order to poison the Orbital race. Also patrolling the world are some of the Octopodes, and they will kill Ozzie if they catch him.

As Ozzie, you move around the world and when you touch a marble, it vanishes. The problem is that you can only move along flat surfaces or drop down to a surface one layer below – fall too far and you shatter. The only way of regaining the higher ground is by moving on to a teleporter which transports you to a fixed point. It can be used as many times as you wish.

The 12 worlds are divided into groups of four. When you complete a group, you acquire a password which gains you entry into the next four.



Once all the worlds have been emptied of all their marbles – a task I have so far failed to perform – the Octopodes have a contingency plan. This involves them placing a replacement set of marbles and making the world invisible.

The game has neat graphics which look good in colour. There is the usual high score table which, when you start playing, is filled with the normal selection of witty names like J. T. Kirk and Old Reptonian.

If you like games which need a little bit of

Sound	6
Graphics	6
Playability	6
Value for money	5
Overall	6

thought, this is one for you. It isn't complicated, but it contains a few interesting problems which should keep you amused for a few hours.

Llewellyn

Second Opinion

Here's fun in the traditional arcade style. It reminds me of Crystal Castles, and has its roots in that old chestnut, Pac Man. You race round a maze collecting marbles while avoiding the monsters. Special transporter squares must be used on the right order and working this out is a bit of a brain teaser.

Janice Murray

Product: Mr Wiz
 Product: Percy Penguin
 Price: £1.99
 Supplier: Blue Ribbon, Nimrod House,
 Beckett Road, Doncaster DN2 4AD.
 Tel: 0302 321134

Wizard of a game

THE software company currently dominating the charts is Blue Ribbon with its budget priced re-runs of Superior Software's old titles. Two of the most popular are **Mr Wiz** and **Percy Penguin**.

The first is an arcade game in which you play the part of Mr Wiz, wandering about your garden eating cherries while avoiding evil gremlins. These nasty little critters can be flattened by dropping enormous apples on their heads. To do this you dig the earth away below the apples just as a gremlin walks underneath.

Extra bonus points can be gained by eating a magic mushroom, but watch out for the gremlins, as this makes them furious.

Percy Penguin takes you to the frozen wastes of the North Pole where you battle the dangerous snobees. Blocks of ice form a maze and you - controlling Percy Penguin - must try to line up three special diamond blocks by kicking them into position.

Ordinary ice blocks can be melted by pushing against them, or kicked away if there is nothing on the other side stopping them from moving. This enables you to rearrange the

maze to your advantage.

Preventing you from lining up the diamond blocks are the snobees, evil weevils that track you down and gobble you up. Fortunately, a well timed kick will send an ice block to squash them flat.

The action isn't particularly fast, but it's quite difficult. The graphics are fairly ordinary compared with recent releases and there isn't much depth to the game. If you're looking for two simple, fun offerings at budget prices you won't go far wrong with these two from Blue Ribbon.

Roland Waddilove

Sound	7
Graphics	7
Playability	8
Value for money	10
Overall	8



Second Opinion

Percy Penguin and Mr Wiz are two typical budget releases. Once classic games, they are now considered to be quite simple both in gameplay and graphics. However, they are cheap and will provide several hours of fun for all the family.

Janice Murray

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TO ORDER, PLEASE USE THE FORM ON PAGE 45

THE words disc and disc drive are often used when talking about computers, but how many people really know what makes the Electron's disc drive work? By understanding the physical nature of discs and drives you will be more able to cope with the situation should things start to go wrong.

A disc system is a fast and convenient way of storing programs and data. Large powerful mainframe computers use hard discs. These are made of rigid aluminium and require a very precise drive mechanism and as clean air to operate in.

Most micros like the Electron use flexible or floppy discs. These have a much smaller capacity for storing data and are much slower, but generally they are more than adequate for the single user, as they are much

**Roland Waddilove
takes your disc drive
apart and shows you
the way it all works**

cheaper and require less finicky conditions than hard discs.

The first point to strike a newcomer, when looking at a disc is the unmistakable fact that it is square. But a moment's inspection will reveal that inside the square plastic case is a round disc made of thin flexible plastic.

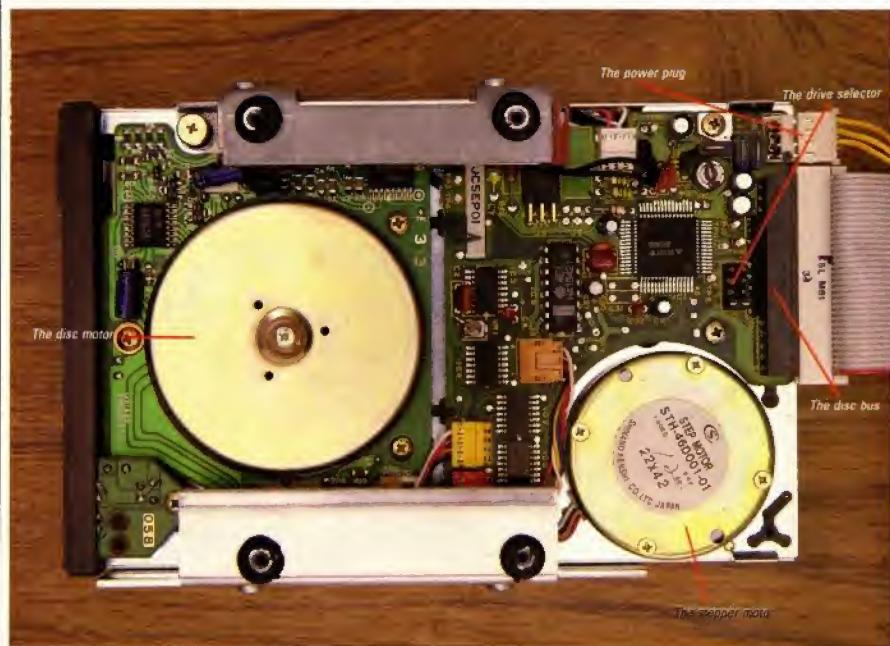
Coated on the plastic is a dark brown, sometimes black, layer of magnetic material. This is usually some form of metal oxide, fer-

ric being the most common. The coating is like the one you get on music cassette tapes, so you can see that a disc is like a cross between a tape and a long playing record.

Do you remember the old riddle: "How many grooves are there on a long playing record?" The answer is, of course, two – one on the front and one on the back. For a floppy disc however, there are no physical grooves. Data is stored as a series of magnetic tracks – concentric rings of data. All tracks hold the same amount of data despite those on the outside being longer than those on the inside.

Some computers do have different amounts of data on different tracks, but most are like the Electron and have the same. This simplifies the disc filing system, and as outer tracks

Exploring the Electron's drives



tend to be more frequently used, it also slightly increases reliability. Some drives — like the ones built in to the Plus 3 — only use one side of the disc, but other drives use both sides.

The disc drive is the "record player", a device to read and write data to the disc. Basically it consists of a drive motor to rotate the disc inside its plastic case. It does this by gripping the centre of the disc. Once it is spinning the read/write head is moved across the surface to position itself over the correct track.

The head is usually moved by means of a stepping motor, which moves through a very small angle, usually 7.5 degrees, every time it receives a pulse. The rotational motion of the motor is converted into lateral head movement by a helical worm gear. Thus the head can be moved with precision over the surface of the disc.

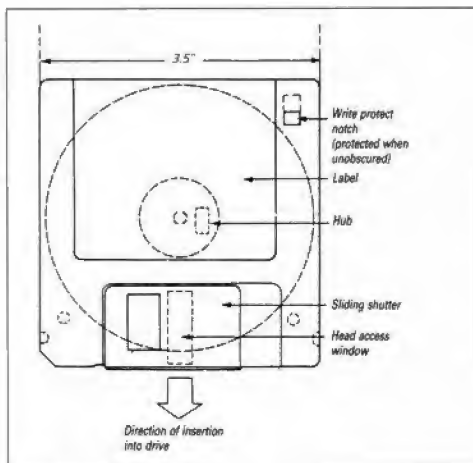
However, when the drive is first switched on the head can be in any position, so there must be some way of finding precisely where it is. This is usually done by a small micro switch which is tripped by the head when it is over track zero.

The Electron will keep issuing pulses to step the head backwards until this switch is tripped. This is known as restoring the head.

In addition to the mechanical parts, a disc drive contains the electronics required to turn the motors on and off, as well as writing to the disc.

These electronics communicate with the Electron over the disc bus, which is just a series of signal wires used to connect several devices together.

Most disc drives stick to a standard bus layout on the edge connector at the back of the drive. So manufacturers can have their own design of drive electronics and still be



The components of a 3.5in floppy disc

compatible with other people's products.

As more than one drive can be connected to a bus, each one must be assigned a number. This is done by making a link on the electronics board. Each drive on the bus must have a unique number to prevent more than one drive being active at any one time. The select signals on the bus will therefore activate only one drive.

At the Electron end of the disc bus there is a WD1772 disc controller, a very complex device. It accepts command numbers from the Electron's 8502 microprocessor and generates the sequence of pulses on the disc bus to enable the drive to carry out the required action.

The 8502 can issue a command to move the read/write head to track 10. The disc controller chip then looks to see where the head is, and works out how many steps, and in what direction they will be, in order to get to it. It then issues that number of head step pulses.

Finally, when the head is in position it reads the track identification number to confirm that it is at the right one. Having completed that task it reports back to the microprocessor that the move has been made successfully.

If the move was not a success this fact is reported and it is up to the disc filing system software to take appropriate action. Usually, the head is restored (moved to track zero) and another attempt is made. Several such attempts may be made before the disc filing system reports an error.

The track identification number mentioned earlier is put on to the disc during the formatting procedure which every disc has to go through before it can be used. This writes on

Floppy discs

Sony was the first company to produce the 3.5in disc system, the format used in the Plus 3, and manufactured the first 3.5in drive to appear in quantity. It was designed to be an extension of the 5.25in drive currently in widespread use, and is completely compatible with it — meaning you can also use 5.25in drives with your Electron.

The floppy disc is housed within a hard plastic case and has a spring loaded metal shutter which covers a slot where the read/write head accesses the disc. A single-sided disc has an unformatted capacity of 0.5Mb and a double-sided drive has a capacity of 1Mb.

A precision servo-controlled DC motor rotates the disc at 300rpm + 1.5%, and the drive must read each bit of data in 0.5 microseconds.

Magnetic disc storage

At one time magnetic tape was the standard storage media for all types of computer systems, but this has been superseded by magnetic discs. Disc drives are available in a variety of sizes and forms, from the extremely high capacity multi-platter hard discs found in mainframes to the small 3.5in drives in the Plus 3.

All disc drives are basically the same, despite differing outward appearances, and all operate in essentially the same manner. They record a pattern of binary numeric data in the magnetic oxide surface coating of the plastic disc. This pattern is written by a small coil contained within a tiny read/write head. The coil also acts as a mini magnetic receiver which can recognise the small magnetic pulses that represent data bits on the disc.

Unlike a hard disc drive, the floppy drive head actually touches the disc surface.

the disc track and sector information.

We have already seen that a track is a ring of data stored on the disc, but this is still too large a chunk of storage to be convenient. This is because disc storage would have to be allocated in tracks, thus wasting a lot of space — a whole track would have to be written to save just one byte.

To remedy this, each track is broken down into a number of sectors — 16 for the ADFS and 10 for the DFS. A sector is the smallest unit of storage the disc holds, and all data transfer to and from the disc is done with sectors of data.



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Forget me knot

HOW often have you sat at your micro for hours on end typing in a long Basic listing only to have the dog trip over the power cable and - Zap - you've lost the lot? Or perhaps you are called away to the telephone or lunch and return to find someone has reset the micro, losing all your work, and loaded up a game?

It's a familiar story and no doubt is responsible for you losing quite a few hairs. To the rescue comes Automatic Program Saver which averts such tragedies once and for all - providing you've got a disc system, that is. What it does is to save your work regularly just in case of power failures, and even if you're called away from the micro it will save your typing before anyone or anything can destroy it. With your work safely stored on disc it doesn't matter what happens to your micro.

First enter and save the listing. When you want to enable the automatic save facility load and run the program, then enter the filename to save your work under at the prompt, followed by how often you want to save it in minutes. Now type NEW and either load the program you are working on or start entering one at the keyboard.

You don't need to do anything further, as your work will be saved automatically at the regular intervals you specified. It is best to set a fairly short interval - say five minutes at most - then if there's a power failure, at worst you'll only lose what you typed in the last 4 minutes 58 seconds.

When you have finished typing, or want to work on something else, you must disable

the routine by typing *FX13.4. This is essential, otherwise the next program you load may also be saved with the same filename overwriting the original one.

How does it work? The program is an interrupt-driven machine code routine that is located in page &100 - the bottom half of the 6502 stack. Every 50th of a second the program decrements a counter and when this

reaches zero the program is saved by calling osfile zero.

The osfile routine used requires a parameter block of 18 bytes. The first two hold the address of the filename, then come the load and execution addresses, each taking four bytes each. Finally the start and end addresses to save - PAGE and TOP - are stored in bytes 10 to 17.

```

10 t%=“Automatic Program Saver”
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 MODE 6
50 PRINT TAB(0,2);t%
60 PRINT “-----”
70 PRINT TAB(0,6);
90 INPUT “Enter filename:”fil%$
90 PRINT
100 PRINT “How often do you want”
110 PRINT “to save the program?”
120 REMWAIT
130 INPUT “Enter time (mins):”T%
140 T%=T%*60*50
150 IF T%<65535 PRINT “Too big!”
160 UNTIL T%<65536
170 PRINT
180 PRINT “*FX13.4 switches it off”
190 top%=:page%+18
200 code%=:140
210 osfile%=:49700

```

```

220 *FX13.4
230 FOR pass=0 TO 2 STEP 2
240 P%=:code
250 [ OPT pass
260
270 PHP:PBA \save registers
280 TGA:PBA:TGA:PBA
290 DEC timer:=BNE exit
300 DEC timer+1:=BNE exit
310 LDA delay:STA timer \reset timer
320 LDA delay+1:STA timer+1
330 LDA page:STA block+11 \save from
340 STA block+3 \load address
350 LDA top:STA block+14 \save to
360 LDA top+1:STA block+15
370 LDY #block MCD 256
380 LDY #block DIV 256
390 LDA #0 \osfile 0
400 JSR osfile
410 .exit
420 PLA:INY:PLA:TAX

```

```

430 PLA:PLP \restore registers
440 RGS
450
460 \variables
470 timer EQUW T%
480 delay EQUW T%
490 .name EQU$ fil%+CHR$13
500
510 \osfile parameter block
520 block
530 EQUW name \filename
540 EQUW 0 \load address
550 EQUW 68023 \exec address
560 EQUW 0 \PAGE goes here
570 EQUW 0 \TOP goes here
580
590 ]
600 MCDT
610 74220=:code MCD 256
620 74221=:code DIV 256
630 *FX13.4

```


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(14) E+/ASR/ £17.38 ex VAT £19.99 inc VAT
 An alternative to the DFS on rom for Plus 3 and ABR users. This optional alternative DFS is designed for use in Sideways RAM (ABR) and allows the user to operate a disc filing system A.Ease when using the Plus 3 (in ADFS page would normally be A1Dae). The DFS is simply loaded using the software supplied with the ABR from disc.
(3.5" ADFS disc + manual)

ADVANCED ELECTRON DFS

(05) E/ £21.00 ex VAT £24.15 inc VAT
 Electron & Plus 3 users... gain BBC compatibility by adding the Advanced Electron DFS (1770 DFS) this is the same disc filing system supplied with the BBC B+. Now you can produce and access (compatible) BBC disc based software. We can also supply 5.25" disc drives to add to your Plus 3 (inc. 2nd. drive adapter). *ACP has produced another superb ROM for the Electron... Electron User Feb '86
(supplied on 16K EPROM + DFS MANUAL)

ADVANCED DISC INVESTIGATOR

(06) M/B/E/C £25 ex VAT £28.75 inc VAT
 A very powerful Disc utility for standard & non-standard discs. Backup most protected discs, edit any type of non-standard disc, check & repair faulty tracks, create new disc formats, copy 40 track discs to 80 track discs, verify two non-standard discs.
 *ADI features an extremely comprehensive sector editor, and one of the finest I've seen"... Tubelink on Prestel!
(supplied on 16K EPROM + manual)

ADVANCED 1770 DFS

3 versions ADM(11) - ADB(12) ADE(13) £30.00 ex VAT £34.50 inc VAT
 ACP have totally re-written the Acorn 1770 DFS, enhancing existing features & adding new ones. The result is a very fast and powerful disc filing system with the ability to operate in double density occupying both sides of a disc (849K). Automatic file relocation, improved file handling, 82 file catalogue and Swears RAM can be used as a fast RAM DISC.
(16K EPROM + comprehensive manual)

PRES - ADVANCED FILE MANAGER

The ultimate 'front-end' for ADFS and DFS includes:

- Menu - infinitely expandable
- Delete - deletes any number of files
- Rename - rename multiple files using wild-cards
- Copy - extremely comprehensive file copier

AFM has four distinct modes:

- MENU** - allows browsing through the files and directories on a disc. Files are started from a menu of up to 7 options chosen for a selected ROM. Loaders are provided for Basic, The Basic Editor, View, ViewSheet, ViewStore, ViewSpell, Edit, Wordwise (+) and InterWord. This list can be expanded infinitely using an Acorn-approved OSWORD call... full details and example in the manual.
- DELETE** - allows files to be marked and then deleted with one keystroke. **RENAME** - allows one or more files to be marked and then renamed using a wildcard name, ie one which varies with each file renamed. Thus you could rename s1, s2 and s3 to be s1_old, s2_old, and s3_old in one operation... and that's only the beginning! As well as using the whole of the original name you can also pick out individual characters to form part of the new name.
- COPY** - the strongest feature of AFM. It is a two stage copy routine. With both source and target directories shown on screen the files to be copied are marked. Once all the files have been marked copying is started and the computer can be left to get on with it!
 Large files can be split across several discs, and recombined. As much as possible of the computer's memory is used for copying files, including unused parts of shadow screen memory, sideways ram banks (inc. AP7), ram cartridges (inc. ABR (32K) and AOR (256K)), tube memory (up to 61K). B+ paged ram (12K) and unused parts of the Slogger Master Ramboard (Electron).
 Comprehensive error trapping and recovery is provided, so a copying run will rarely have to be aborted unfinished! And there's much, much more.

Advanced File Manager 1.06 (E) PRES 1986

Source: Advanced Disc 15.1.1.1 (M) Archive	Target: Advanced Disc 15.1.1.1 (M) Archive
DIR	DIR
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
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86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

Screen picture shows AFM in Copy mode on Master Turbo

AFM follows the PRES 'Master Plan' of upwards compatibility - it runs on Electron, BBC B, B+, B+128, Master 128 and Compact, with Second/Co-processors and Acorn-compatible versions of DFS & ADFS.
£25 ex VAT £28.75 inc VAT

DATABASE PUBLICATIONS: Electron software now available exclusively through PRES on 3.5" disc

Electron User 1988 Monthly Disc£4.75
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 *Arcade Game Creator£5.95
 Nursery Rhymes£6.95
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5.25" disc versions available only
 *Arcade Game Creator£5.95
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PRES

OUR TOP SELLING PRODUCT THE COMPLETE ELECTRON DISC UPGRADE

THE NEW IMPROVED AP3 Mk II

Please phone for details

ADVANCED PLUS 5

A unique interface for those wanting the maximum expansion from just one slot in the PLUS 1. AP5 contains: a User port for connecting peripherals such as a mouse, 1 MHz bus allowing MMS 5000(E), prommers and various control devices to be added, Tube interface for connecting an Acorn 2nd. processor or even a Master Turbo board (through a Co-Pro Adaptor) - & TWO spare ROM sockets (1 high priority). All hardware connections are Acorn compatible thereby allowing many BBC products to be added (remember that some software modification may be necessary for the Electron). So although some expansion options may appear expensive on an Electron you do have upward compatibility.

£58.00 Ex VAT; £68.24 Inc VAT

ADVANCED PLUS 1 . . . The plus 1 is the main expansion for the Electron. It provides the Centronics parallel printer, port, joystick interface and 2 cartridge slots into which go ROM cartridges including View, Viewsheet, Pascal, Logo and our own popular range of disc upgrades. £50.00 excl VAT; £57.50 Inc VAT

ADVANCED PLUS 6 . . . a fully buffered 6 ROM expansion module for the Electron user. AP6 is fitted inside the advanced Plus 1 or a modified Acorn Plus 1 (when used with the Acorn Plus 3, 5 ROM sockets are available). All sockets are designed to accept either ROM/EPROMS or RAM chips. A further feature is the optional AP7 upgrade. "A marvellous piece of design . . . don't hesitate, buy it!" - *EU, May '88*

£33.00 excl VAT; £37.95 Inc VAT
UPGRADE SERVICE for the original Acorn Plus 1 to Advanced Plus 1 and AP6. This will provide all the benefits of AP6 and also includes the printer circuit modification for some modern printers. (AP6 can be fitted to original Plus 1 by users with soldering experience) for upgrade service add £7.00 + VAT to AP6 price i.e. £40.00 excl VAT; £46.00 Inc VAT

Incl. Mod. Fitting + Testing & Carriage. Send to:
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ADVANCED ROM ADAPTER 2

An Acorn approved cartridge containing a card with special 'zero' profile sockets that allow you to fit compatible 8k or 16k EPROMS/ROMS. The cartridge is fully enclosed providing complete protection for your ROMS. Simple to use - No switching - complies fully to the Acorn (sideways) Rom filing system.

The best ROM cartridge is by far the ARA 2. *A&E Dec 86*
£13.00 excl VAT; £14.95 Inc VAT

ADVANCED BATTERY-BACKED RAM

A standard Acorn approved cartridge but containing 32k (2 x 16k) of sideways RAM. This added bonus is the battery-backed feature that holds the RAM contents when the power is switched off! Different ROM images can be loaded into either bank from ROM images previously saved. The banks can also be locked to imitate ROM use. Now it is possible to have View & ViewSheet in one cartridge every time you switch on. Other uses include &E00 ADFS, printer buffer, ROM software development. The use of ABR is simplified by the newly written PRES software utilities which include: SaveROM, LoadROM, Lock, Unlock, Printer Buffer, Zero and MakeFROM a new utility to put your own software from disc or tape into ABR & use the ROM filing system. All software is supplied in ABR with a simple menu to transfer the utilities to your own media. No hardware switching - totally software controlled. Instructions for using supplied software and necessary information for users developing their own applications.

"It's a superb add-on and a must for all serious Electron users". . .

Electron User

£39.00 excl VAT; £44.85 Inc VAT

PRES POLICY

1. To provide the best possible service & assistance to users.
2. Supply Acorn based or Acorn compatible products & to enable upward compatibility wherever possible.
3. Provide tested products with special attention to quality of design, components & production.
4. "Only to cash cheques & credit card receipts when we know we can supply the goods ordered."

DISC INTERFACES (Plus One required)

AP3 INTERFACE: As supplied with AP3 package. A fully Acorn compatible disc interface that will accept any standard 5.25" or 3.5" 80T drive with PSU. It runs Acorn's ADFS (as supplied on Acorn Plus Three, Master 128, Master Compact and now the Archimedes) supplied with A.D.F.S. manual and welcome disc + Utilities and 3 bonus games (please specify 3.5" or 5.25" 80T format). Also provides a spare 16K rom socket. Price £52.00 ex VAT £59.80 Inc VAT

AP4 INTERFACE: A fully Acorn compatible disc interface that will accept any standard 5.25" or 3.5" drive with PSU. It runs the 1770 DFS (as fitted in the BBC 'B' and Master) gets pace at &E00 - has utilities in rom and provides a spare 16K rom socket (DFS manual included). Price £60.83 ex VAT £69.95 Inc VAT

AP34 INTERFACE: Get the best of both filing systems. Now available from PRES the ultimate interface. Fitted with both Acorn approved filing systems. . . Acorn's current standard ADFS and Acorn 1770 DFS (which can be run at &E00) ADFS and DFS manuals supplied + ADFS welcome disc with utilities. Price £69.55 ex VAT £79.98 Inc VAT
Please state 5.25" or 3.5"

ADVANCED PLUS 2 ROM

We feel this is one of the best, low cost, additions we have produced for the Electron & +1 user, especially for Plus 3, AP3 & ABR users.

Now with this easy to fit upgrade you can add:

1. Fix for Tape filing system in Hi-res screen modes.
2. "ROMS" - to display all ROMs/ROM images present on the system.
3. "UNPLUG" - disable ROM/RAM image.
4. "INSERT" - enables or inserts a previously unplugged ROM.
5. "KILL" - to totally disable the Plus 1.
6. "LOCK" - to lock a sideways RAM bank in ABR, AQR, AP7.
7. "LROMS" - to lock all sideways RAM banks found.
8. "UNLOCK" - to unlock a sideways RAM bank in ABR, AQR, AP7.
9. "UROMS" - to unlock all sideways RAM banks found.
10. "SAVEROM" - saves a copy of a ROM image to the current filing system.
11. "LOADROM" - loads a ROM image from the current FS into a RAM bank.
12. "FORMAT" - will format an ADFS disc for Plus 3 or AP3.
13. "VERIFY" - reads and tests every sector on an ADFS disc.
14. "VFORM" - formats and verifies an ADFS disc in one command.
15. "BUILD" - creates a text file that can be used by "EXEC (ie BOOT)".
16. "LIST" - displays a numbered listing of a text file.
17. "TYPE" - displays a file on screen with no line numbers.
18. "DUMP" - to view a file's contents on screen.
19. "LANG" - selects a default language to be booted on <CTRL-BREAK>
20. "HELP" - provides a full 'help' list on all the ROM's commands
21. "ACRAGE" - selects the specified page in any AQR present.

Now there is no need to search for your utilities disc every time you want to Format/Verify a disc, Build a Boot file or Lock/Unlock/Load a ROM image into ABR Plus much more . . . the ideal companion from the company that produces the Acorn Plus 1.

£11.00 ex VAT; £12.85 Inc VAT

"The AP2 is the definitive Plus 1 Rom. . . I'm not sure what I'd do without it. . . Like all of PRES's other products it's been well worth waiting for." *EU July '88*

PRES ABR SOFTWARE

The new PRES ABR software now available separately containing: SaveROM, LoadROM, Lock, Unlock, Printer Buffer, Zero and MakeROM a new utility to put your own software from disc or tape into ABR & use the ROM filing system. Supplied on 3.5" ADFS or 5.25" DFS disc. 3.5" £9.99 ex VAT; £11.49 Inc VAT
5.25" £8.99 ex VAT; £10.34 Inc VAT

ADVANCED PLUS 7

An internal battery-backed RAM upgrade for the Advanced Plus 6, TWO 16K pages of Sideways RAM, battery-backed and featuring full write protect facility. Just like ABR but fitted internally & vacating a cartridge slot. This product is compatible with all Acorn BBC/Master & Electron computers. £39.50 ex VAT; £45.42 Inc VAT

** USER PORT **

A new low cost unit for those who just require a user port interface. Supplied in a standard size, Acorn approved cartridge, with the standard connector on top. Inside is a spare PCMC socket which can also be configured for high priority use such as mouse software.

£19.99 ex VAT; £22.95 Inc VAT

ADFS VERSION 1.1

Suitable for existing Plus 3 or A.P.4 users. This new version has the software files for Zysyehelp, write protect disable & compaction. Also Winchester code has been replaced with the necessary driving software to handle ACR as a 256k RAM DISC. Please note - ADFS is Acorns adopted standard filing system supplied on the Plus 3, Master 128, Master Compact & now the Archimedes. Supplied on 16k ROM with Welcome disc & utilities. Please state 3.5/25 25 welcome disk.

£14.95 ex VAT; £17.19 inc VAT
(ADFS manual supplied separately)

ADFS E00

For Electron users with either Plus 3 or A.P.4 and 32k of S/W RAM i.e. ABR. All the benefits of ADFS but without all the loss of RAM! Includes all the software 'files' as in version 1.1 as well as the AQR/RAM DISC code and an 'FX' call for managing the new & original ADFS. One of the most frequent questions we are asked "How do I get back the memory lost on my Plus 3 system?" Answer: PRES ADFS & E00 regains 3.75k leaving page @ E00 the same as 'Tape'

ADFS E00 supplied: 3.5" ADFS (manual available separately)
£14.95 ex VAT; £17.19 inc VAT
5.25" ADFS (manual avail. sep.) £14.00 ex VAT; £16.10 inc VAT
5.25" DFS (2 discs+ADFS manual) £19.00 ex VAT; £21.85 inc VAT
(See Special Package Prices)

AP4 MOD

This converts an AP3 to an AP34 (ie. DFSEOC) supplied as a two chip set, full documentation and fitting instructions.
£21.74 ex VAT. £25.00 inc. VAT

ADVANCED GAMES COMPENDIUMS - ON DISC

With so many of our products providing more 'serious' add-ons for the Etk; we thought it was time to allow easy access to some of the favourite games ON DISC! ... Three volumes of popular games, previously only available on tape, now instantly loadable from menu on disc. Each volume contains EIGHT menu selectable games. Available on 3.5" ADFS or 5.25" ADFS.

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A.D.F.S Guide Manual.....£5.00

NEW

ELECTRON VERSION OF A.L.P.S.

(Adventure Language Programming System)

Well received on the BBC now available for Electron users on a 16k Rom and utilised disc either 3.5" ADFS or 5.25" DFS
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NEW

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PRES Special 3.5" double sided 80 track, inc. psu.
Please phone for details

DISCS

3.5" 10 in plastic library box - ideal for Plus 3 users £19.95
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5.25" Twin Gift Pack £1.49

VIEW CARTRIDGE ... the Acornsolt word processor for the Electron and Plus 1. Inc. full documentation £14.95
VIEWSHEET CARTRIDGE ... the Acornsolt spreadsheet for the Electron and Plus 1. Inc. full documentation £14.95
VIEW & VIEWSHEET ... both products as above 'special price' £22.00

MUSIC 5000

Turns your Electron into a computerised music production studio in which you can take a piece of music all the way from a sheet score, an idea of your own or one of the supplied examples, through entry, arrangement, replay and 'live' mix-down to a finished performance complete with custom instruments and studio effects.

Music 5000 is supplied as a powerful, stereo, digital, eight voice, 16 channel synthesiser with ROM software (containing the AMPLE language), disc software containing the example music files and full documentation.
The requirement for Electron Music 5000 is ... Electron, Plus 1, disc system (3.5 or 5.25 drive) running DFS or ADFS (preferably @ E00) i.e. Acorn Plus 3, A.P.3 or A.P.4, 1 MHz bus (best option A.P.5.), and hi-fi amplifier or similar (Music 5000 has a standard 5 pin DIN audio connector for sound output). (Please state disc size & FS when ordering) £99.00 (ex. VAT) £113.85 (inc. VAT)

SPECIAL PACKAGE PRICES

AP1 + AP3	£139.00 ex VAT	£159.85 inc VAT
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AP4 + CS400	£147.78 ex VAT	£169.95 inc VAT
AP1 + AP4 + CS400	£189.00 ex VAT	£217.35 inc VAT

ACCESSORIES

ELECTRON POWER SWITCH

For those who are fed up with removing the power connector every time when resetting the computer or for those whose jack-plug connector has become unreliable by removing the power at random! This useful accessory provides a double-pole in-line switch with a new power jack-plug already attached, just connect to the existing lead, having removed the old jack-plug. £3.96 ex VAT; £4.55 inc VAT

AP3 2nd DRIVE LEAD

Replaces existing drive cable with one containing an extra connector for adding a second drive configured as Drive 1.
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PLUS 3 2nd DRIVE ADAPTOR

Converts the fitting at the back of the original Acorn Plus 3, to take a standard disc drive connector when adding a second drive which has been configured to Drive 1.
£6.91 ex VAT; £7.95 inc VAT

Panasonic KX-P1081 Printer Ribbon

£5.50 ex VAT; £6.32 inc VAT

ELECTRON ADVANCED USER GUIDE ... further reading and information for the Electron user £3.95

ADVENTURE GAMES ON DISC

5 adventures available on disc for Electron users. Each game is sold separately on disc: Ultimate Prize, Dreamtime, Pirates Parli, Taroda Scheme and Stranded.

3.25" ADFS £6.95 ex VAT per Disc; £7.99 inc VAT per Disc

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COMING SOON

ADVANCED BASIC EDITOR+ ... an exciting new product based on Acorn's original Basic Editor. It contains all the original features plus enhancements that make it one of the most powerful basic editors available. Supplied as a 32k ROM module or a cartridge with spare ROM socket.

1MHz BUS ... a new low cost unit for those who just require a 1 MHz Bus interface. Supplied in a standard size, Acorn approved cartridge, with the standard connector on top. Inside is a spare ROM socket for any application.

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Credit Card No.:	Exp date			(Ref E4)



(In event of any query - please include your tel. no.)

John Geraghty presents you with a very fast machine code graphic utility to fill shapes with any pattern

Painting with patterns

THE Electron's powerful BBC Basic has an impressive array of graphics facilities, but there is one notable exception, and that is a fill command. That omission has now been rectified by the addition of this fast machine code fill routine. However, not only does it paint any shape in any colour, it will also do it with any pattern you care to define.

Using it is a piece of cake. First enter and

run Program 1 - Pattern Fill - to assemble the machine code routine. It will be saved to tape or disc automatically with the filename PAT-FILL. Now it's ready to use.

At the start of your program you must *LOAD PATFILL. To fill a shape you have drawn on the screen first store the pattern you want to paint it with at &100; this consists of 16 bytes of data. Use a MOVE com-

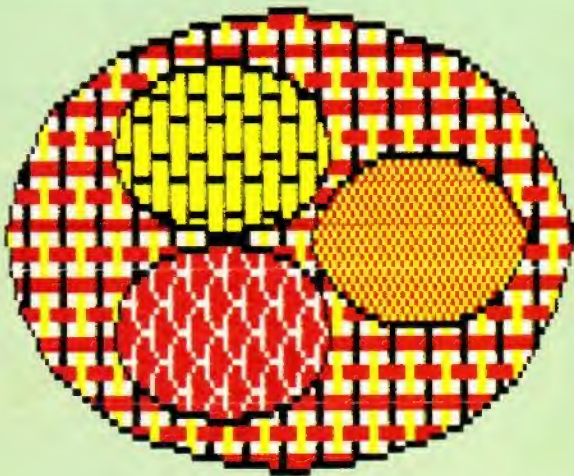
mand to move the graphics cursor to a point somewhere inside the shape and CALL &A00. To see the fill routine in action enter and run the demonstration - Program 11.

The pattern data consists of 16 successive bytes taken directly from the screen memory. In Mode 0 this will be exactly two characters, in Mode 1 and 4 it's one character and in Mode 2 and 5 it's half a character. You can

```

10 REM Pattern Fill
20 REM By John Geraghty
30 REM (c) Electron User
40 MODE6
50 PROCAssemble
60 PRINT:PRINT"Saving..."
70 *SAVE PATFILL ADD HEX
80 END
90 :
100 DEF PROCAssemble
110 hlook=470
120 oldlx=470:oldly=472:oldrx=474
130 gdot=478:qdot=479
140 xstep=47A
150 qlag=47B
160 pindex=47B
170 lmask=47C:rmask=47E
180 laddr=480:raddr=482
190 column=484
200 mask=485
210 temp=486
220 :
230 hlookaddr=4D4
240 pat_store=4100
250 row=4310
260 offset=431A
270 pix_row=4324
280 bytes_per_char=434F
290 bytes_per_line_hi=4353
300 mode=4355
310 fgoal=4359
320 fgopt=435B
330 pix_per_byte=4361
340 lpix=4362
350 queue=4600
360 ovrchr=420E
370 ovrchr=420C
380 ovrchr=420A
390 :
400 FOR pass=0 TO 2 STEP 2
410 P=&A00
420 [OPT pass
430 \pixel width into xstep
440 LDZ bytes_per_line_hi
450 LDA bytes_per_char
460 .loop1
470 LSR A
480 DEX
490 BNE loop1
500 STA xstep
510 :
520 STX qdot
530 STX gdot
540 STX qlag
550 \equivalent to GOCL0,15
560 STX fgopt
570 DEX
580 STX fgoal

```



```

590 :
600 \check current cursor pos is
610 \on background, end if not
620 LDA #9
630 LDZ #610
640 LDY #3
650 JSR ovrchr
660 LDA #314
670 BNE end
680 :
690 \plot sideways from initial poin
t
700 LDY #449
710 JSR plot_option
720 LDA #0
730 LDZ #4
740 .loop2
750 JSR ovrchr
760 DEX
770 BNE loop2
780 \queue initial data
790 JSR qdata

```

```

800 :
810 \main loop
820 \more to fill
830 LDA #FF
840 BMI escape
850 \get set of data onto para block
860 LDZ #7
870 LDA #8
880 CLC
890 ADC gdot
900 STA gdot
910 DEX
920 .loop3
930 DEY
940 LDA queue,Y
950 STA block,X
960 DEX
970 BRL loop3
980 \prepare to fill above
990 CLC
1000 LDA oldy
1010 ADC #4

```

see this pattern data in the demonstration program.

How can you make a pattern? Well you could try random numbers, but this is likely to produce variable results. Try it and make a note of the data bytes for any interesting patterns. The best way of designing patterns is with a sprite designer, and for this you could use the one published in the February 1988 issue of *Electron User*.

The fill algorithm maintains a queue system to keep track of the fill "fronts" and if the program is pushed to the limit the queue will overflow. Don't worry about this as nothing disastrous will happen - the routine will fill what it can and then stop.

If the fill starts to leak out from a break in the shape you are filling press Escape to halt the process.

```

1020 STA oldy
1030 BCC skip1
1040 INC oldy+1
1050 .skip1
1060 JSR line
1070 BHI qfull
1080 \prepare to fill below
1090 BCC
1100 LDA oldy
1110 SBC #8
1120 STA oldy
1130 BCS skip2
1140 DEC oldy+1
1150 .skip2
1160 JSR line
1170 BHI qfull
1180 LDA qtop
1190 CMP qtop
1200 BNE more_to_fill
1210 :
1220 .escape
1230 LDA #67E
1240 JSR osbyte
1250 \if qflag=0 it means that queue
never reached maximum size: in this ca
se qtop/8 is no. of points to be gone
over with pattern
1260 LDY qflag
1270 BNE qfull
1280 LDA qtop
1290 STX qtop
1300 LSR A
1310 LSR A
1320 LSR A
1330 STA pindex
1340 BPL finish_pat\ always
1350 :
1360 \if queue is full there are 32 s
ets of points to be taken off and gone
over with pattern
1370 .qfull
1380 LDA #620
1390 STA pindex
1400 .finish_pat
1410 JSR pattern
1420 LDA qtop
1430 CLC
1440 ADC #8
1450 STA qtop
1460 DEC pindex
1470 BNE finish_pat
1480 .end
1490 RTS
1500 :
1510 .pattern
1520 \plot left hand point to get the
address of byte containing that point

```

```

1530 LDY qtop
1540 JSR plot_extremes
1550 STX laddr
1560 STY laddr+1
1570 TRY
1580 LDA mask_data-1,Y
1590 STA lmask
1600 :
1610 \set column to correct value for
first byte on left
1620 LDA pix_per_byte
1630 ASL A
1640 AND pix_no
1650 TRX
1660 LDA #8
1670 CPX pix_per_byte
1680 BCC odd
1690 BCR #8
1700 .odd
1710 BCR #8
1720 STA column
1730 :
1740 \now the same for the extreme ri
ght-hand pixel

```

Turn to Page 30 ▶



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```

2560 BNE loop5
2570 \address of pixel into X and Y
2580 LDA blockaddr
2590 CLC
2600 ADC offset
2610 TAX
2620 LDA blockaddr+1
2630 ADC #0
2640 TAY
2650 \offset for mask data into A
2660 LDA pix_no
2670 AND pix_per_byte
2680 \carry always clear here
2690 ADC pix_per_byte
2700 RTS
2710 :
2720 .line
2730 LDA oldix
2740 STA rx
2750 LDA oldix+1
2760 STA rx+1
2770 .loop
2780 JSR look_for_rx
2790 LDA rx
2800 CMP oldrx
2810 LDA rx+1
2820 SBC oldrx+1
2830 BFL line_end
2840 \test if ready to pattern:
2850 LDA qflag
2860 BNE pattern_fill
2870 LDA qtop
2880 BNE test_end
2890 INC qflag
2900 .pattern_fill
2910 LDA rx
2920 STA
2930 LDA rx+1
2940 STA
2950 JSR pattern
2960 PLA
2970 STA rx+1
2980 PLA
2990 STA rx
3000 .test_end
3010 JSR fill_in
3020 BNE loop5
3030 \flag queue full
3040 LDA #6FF
3050 .line_end
3060 RTS
3070 :
3080 \the extreme th end of line from
rx,oldy becomes current cursor pos.
3090 .look_for_rx
3100 LDY #65C
3110 JSR plot_option
3120 LDA rx
3130 JSR owerch
3140 LDA rx+1
3150 .into_look_for_rx
3160 JSR owerch
3170 LDA oldy
3180 JSR owerch
3190 LDA oldy+1
3200 JMP owerch
3210 :
3220 .fill_in
3230 \plots left, right from
rx+nxstp,
oldy to boundary:
3240 LDY #64D
3250 JSR plot_option
3260 LDA rx
3270 CLC
3280 ADC nxstp
3290 PHP
3300 JSR owerch
3310 PLP
3320 LDA rx+1
3330 ADC #0
3340 JSR into_look_for_rx
3350 :
3360 \set of data for left and right
line ends onto queue; add 8 to qtop;
3370 .qdata
3380 LDY #qtop
3390 LDY #queue DIV#100
3400 LDA #60D
3410 JSR owerd
3420 LDA qtop
3430 CLC
3440 ADC #8
3450 STA qtop
3460 CMP qbck
3470 RTS
3480 :
3490 .plot_option
3500 LDA #619
3510 JSR owerch
3520 TZA
3530 JMP owerch
3540 :
3550 .mask_data
3560 EQUID 47FFF55FF
3570 EQUID 47FFF1133
3580 EQUID 4070FF13F
3590 EQUID 40103
3600 |
3610 NEXT
3620 ENDPROC

```

Program II

```

10 REM Pattern Fill Demonstration
20 REM By John Geraghty
30 REM (c) Electron User
40 MODE 6
50 \LOAD PATYILL
60 MODEL
70 PROCdemo
90 :
100 DEF PROCdemo
110 PRINT "Mode 1 demonstration:"
120 PROCcircle(540,400,96)
130 PROCcircle(740,400,96)
140 PROCcircle(640,573,96)
150 PROCcircle(640,458,224)
160 :
170 REM pattern1
180 !6100=6FF0F0606
190 !6104=699F0606
200 !6108=96960606
210 !610C=6FFF0606
220 MOVE640,458:CALL 6A00
230 :
240 REM pattern2
250 !6100=6FFF0F0F0
260 !6104=6FFF0F0F0
270 !6108=6FF9F9F9F
280 !610C=6FFF1F1F1
290 MOVE640,400:CALL 6A00
300 :
310 REM pattern3
320 !6100=STRINGS(8,CHR$(65+CHR$(90))
330 MOVE640,573:CALL 6A00
340 :
350 REM pattern4
360 !6100=40C0B0707
370 !6104=4010B0F0F
380 !6108=4010B0F0F
390 !610C=40C0B0707
400 MOVE740,400:CALL 6A00
410 ENDPROC
420 :
430 DEF PROCcircle(x,y,r)
440 MOVEx,y+r
450 FOR I=0 TO 2*PI STEPPI/10
460 DRAW=atr*SIN I,y+r*COS I
470 NEXT
480 ENDPROC

```

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DIAMONDS is a one player solitaire type game which was popular during the Victorian period, and may have been played by wives to pass away the time while their husbands were at the local tavern. It is played on a double diamond shaped board with blue and red counters. The red counters occupy the left hand side of the board and the blue counters the right.

Object of the game is to move the blue counters to the left and the red counters to the right so they effectively swap positions. This is done either by sliding a counter on to an adjacent empty square or by jumping over a counter of the opposite colour to an empty square the other side of it.

All the moves must be diagonal and the red counters can only move right, while the blue ones must move left.

It may sound complicated, but in fact it is very simple to play. All the squares are labelled with a letter of the alphabet, and to move a counter you just tap the letter on the keyboard corresponding to the square with the counter on.

The game is fully error trapped, so don't be afraid to experiment as you won't be allowed to make a wrong move. You'll soon find yourself blocked in and unable to continue. In this situation press X to restart the game.

And just in case you think the puzzle is impossible to solve there's a built-in demonstration of just one of many solutions.



Can you complete this mind-boggling puzzle from Arthur Lindon?



```

10 REM Diamonds
20 REM by Arthur Lindon
30 REM (c) Election User
40 REM
50 MODES=VDU19,1,3,0,0,0
60 VDU23,224,0,16,16,56,56,124,124,
254
70 VDU23,225,254,124,124,56,56,16,1,
6,0
80 AB=CHR$22+CHR$(10)+CHR$(6)+CHR$(225
90 B)= " " +CHR$(10)+CHR$(6)+ " "
100 PRINT:INB(11,10); "DO YOU WANT TO
SEE";INB(10,12); "THE INSTRUCTIONS? Y/N
"
110 PROC=yesno
120 IF ANS="Y" THEN PROC:instr
130 DIM Ch(17),Xs(17),Ys(17)
140 MODES="MGL1,0
150 VDU23,1,0;0;0;0;0;
160 VDU19,2,4,0,0,0,19,3,3,0,0,0
170 PROC:inboard
180 PRINT:INB(1,1); " DO YOU WANT A
";INB(2,3); " DEMONSTRATION?";INB(7,5);
" Y/N "
190 PROC=yesno
200 IF ANS="Y" THEN PROC:dmo
210 PRINT:INB(1,1); "PRESS LETTER OVER
";INB(1,3); " COUNTER TO BE ";INB(7,5)
); "MOVED"
220 Cnt=0
230
240 REPEAT
250 finish=FALSE

```

```

260 REPEAT
270 fault=FALSE
280 *MGL1,0
290 REY=(GET AND 223)-64
300 IF REY=24 THEN 370

```

```

(17);INB(2,3);"CONGRATULATIONS";INB(7,
5);SFC(5)
440 PRINT:INB(1,30);"WANTER TRY? Y
/N"
450 PROC=yesno
460 IF ANS="Y" THEN PROC:printboard:
GOTO210
470 VDU23,1,1;0;0;0;0; *MGL2,0
480 END
490
500 DEFPROC=yesno
510 *MGL1,0
520 REPEAT
530 ANS=CHR$(GET AND 223)
540 DCELL:ANS="Y" OR ANS="N"
550 ENDPROC
560
570 DEFPROC=findblank
580 FOR I=1 TO 17
590 IF Ch(I)=0 THEN BLANK=I;I=1:17
600 NEXT I
610 ENEFFCC
620
630 DEFPROC=red
640 IF Xs(BLANK)-Xs(RED)=2 AND ANS
(Ys(BLANK)-Ys(RED))=4 THEN 660
650 IF Xs(BLANK)-Xs(RED)=4 AND ANS
(Ys(BLANK)-Ys(RED))=8 THEN PROC:dell
even ELSE fault=TRUE
660 IF NOT fault THEN PROC:move
670 ENDPROC

```

PROCEDURES	
findblank	Search array for a blank
red	Check that move is legal
blue	Check that move is legal
finished	See if the puzzle is done
demo	Demonstrate the solution
instr	Print the instructions

```

310 IF REY<1 OR REY>17 THEN fault=
TRUE:GOTO370
320 IF Ch(RED)=0 THEN fault=TRUE:GO
TO370
330 COLOUR128=COLOUR3
340 Cnt=Cnt+1:PRINT:INB(9,26);Cnt%
350 PROC:findblank
360 C=Ch(RED):IF C=1 THEN PROC:red
ELSE PROC:blue
370 IF fault THEN VDU7
380 UNTIL fault=FALSE
390 PROC:finished
400 UNTIL finish OR REY=24
410
420 COLOUR128=COLOUR3
430 IF finish THEN PRINT:INB(1,1);SFC

```



```

690
690 DEFPROCblue
700 IF X% (KEY%)=X% (BLANKS)=2 AND ABS
(X% (KEY%)-Y% (BLANKS))=4 THEN 720
710 IF X% (KEY%)=X% (BLANKS)=4 AND ABS
(X% (KEY%)-Y% (BLANKS))=8 THEN PROCodd1
else: ELSE fault=TRUE
720 IF NOT fault THEN PROCmove
730 ENDPROC
740
750 DEFPROCodd1:move
760 X%=OR (KEY%)=X% (BLANKS)):DIV2
770 Y%=(X% (KEY%)+Y% (BLANKS)):DIV2
780 FOR I%=1 TO 17
790 IF X% (I%)=X% AND Y% (I%)=Y% THEN
NEXT I%=17
800 NEXT
810 IF C% (I%)=C% THEN fault=TRUE
820 ENDPROC
830
840 DEFPROCmove
850 COLOUR1:CLS:CLS
860 PRINTING ON (KEY%), Y% (KEY%):BS
870 PRINTING ON (BLANKS), Y% (BLANKS)):

```

```

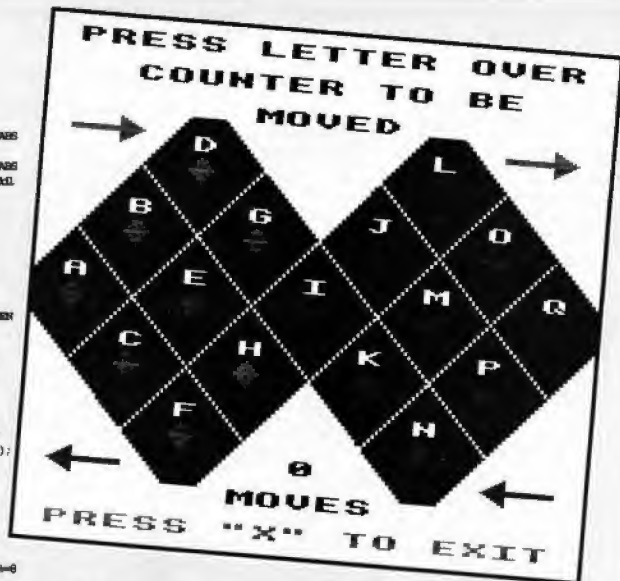
880 C% (KEY%)=0:C% (BLANKS)=C%
890 ENDPROC
900
910 DEFPROCfinished
920 flag=FALSE
930 FOR I%=1 TO 8
940 IF C% (I%)<2 THEN flag=TRUE:I%=8
950 NEXT
960 IF flag THEN 1000
970 FOR I%=10 TO 17
980 IF C% (I%)<1 THEN flag=TRUE:I%=1

```

```

990 NEXT
1000 IF NOT flag THEN findab=TRUE
1010 ENDPROC
1020
1030 DEFPROCprintboard
1040 DATA 1,1,16,1,3,12,1,3,20,1,5,8,
1,5,16,1,5,24,1,7,12,1,7,20,0,9,16
1050 DATA 2,11,12,1,11,20,2,13,8,2,13
,16,2,13,24,2,15,12,2,15,20,2,17,16
1060 RESTORE
1070 FOR I%=1 TO 17
1080 READ C% (I%), X% (I%), Y% (I%)
1090 NEXT
1100 COLOUR1:CLS
1110 GOTO 3
1120 MOVE 0:DRW 0,1020:DRW 0,216,1020
:DRW 0,216,0:DRW 0,0
1130 MOVE 4:DRW 0,216,4:MOVE 1016:DR
W 0,216,1016
1140 MOVE 384,832:MOVE 820,832:PLOTS,6
08,608:PLOTS,0,512
1150 PLOTS,608,352:PLOTS,0,448
1160 PLOTS,384,128:PLOTS,316,128
1170 MOVE 828,832:MOVE 996,832:PLOTS,6
08,608:PLOTS,1216,512
1180 PLOTS,608,352:PLOTS,1216,448
1190 PLOTS,828,128:PLOTS,896,128
1200 GOTO 0
1210 MOVE 352,352:DRW 80,740:MOVE 216,2
24:DRW 60,612
1220 MOVE 12,344:DRW 1004,740:MOVE 732
,224:DRW 1116,608
1230 MOVE 732,736:DRW 1116,352:MOVE 508
,616:DRW 696,228
1240 MOVE 220,736:DRW 604,352:MOVE 32,6
08:DRW 676,224

```



```

1250 GOTO 1
1260 MOVE 220,800:MOVE 172,824:PLOTS,1
72,776:MOVE 64,804:MOVE 172,804:PLOTS,6
4,796:PLOTS,172,796
1270 MOVE 1168,800:MOVE 1100,824:PLOTS
,1100,776:MOVE 992,806:MOVE 1100,804:PL
OTS,992,796:PLOTS,1100,796
1280 GOTO 2
1290 MOVE 84,160:MOVE 112,184:PLOTS,11
2,136:MOVE 112,164:MOVE 220,164:PLOTS,1
12,156:PLOTS,220,156
1300 MOVE 992,160:MOVE 1040,184:PLOTS,
1040,136:MOVE 1040,164:MOVE 1168,164:PL
OTS,1040,156:PLOTS,1148,156
1310 FOR I%=1 TO 17
1320 COLOUR1:CLS
1330 PRINTING ON (I%), Y% (I%)-1:CHR (I
+64)
1340 COLOUR (I%)
1350 IF C% (I%)>0 THEN PRINTING ON (I%)
,Y% (I%):AS
1360 NEXT
1370 COLOUR1
1380 COLOUR:PRINTING (1,30) "PRESS "X
" TO EXIT"
1390 COLOUR:PRINTING (9,26) "0":TAB (7,
28) "MOVES"
1400 ENDPROC
1410
1420 DEFPROC:move
1430 PRINTING (3,1):SPC (13):TAB (16,3),
":TAB (8,5):SPC (3)
1440 Z%="21122221111121211111111222
222212222111111121221198029175286980
31497153647529475361280917586941308971
"
1450 ON% =0
1460 FOR Z%=1 TO 52
1470 X%="0"VAL (Z% (25,Z% 1)):VAL (M
ID% (25,105-Z%),1)-10

```

```

1480 COLOUR:CLS
1490 ON% =ON%+1:PRINTING (9,26):ON%
1500 fault=FALSE
1510 PROCfindblank
1520 C%=C% (KEY%):IF C%=1 THEN PROCadd
ELSE PROCblue
1530 T%=TIME:REPEAT UNTIL TIME=T%+50
1540 NEXT
1550 COLOUR:CLS:CLS
1560 PRINTING (1,30):" PRESS ANY KEY
"
1570 F%2,0
1580 KEY%=GET%
1590 PROCprintboard
1600 ENDPROC
1610
1620 DEFPROCinstr
1630 CLS:PRINTING (16):"TIDICHS"" T
he object of the game is to transpose""
"" the red and blue counters.""
1640 PRINT"" All moves must be perall
el to the"" lines and land on a blank
square. Red"" must move to the right
and blue to the"" left. Backward mov
es are not allowed."
1650 PRINT"" A counter may jump over
one of the"" opposite colour, provide
d the above"" conditions are observed
"
1660 PRINT"" To move press the letter
above the"" counter you want to move
"" If you cannot move press "X" to
exit."
1670 PRINT"" The demonstration progr
am takes 52"" moves. The smallest num
ber of"" moves is 46 - can you d
o it in less""
1680 PRINT"" Press any key"
1690 KEY%=GET%
1700 ENDPROC

```

If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

Finalist for the Home Software
of the Year Award



Contains 32 page booklet giving clear,
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Word Processor: Ideal for writing letters and reports. There is a constant display of both time and word count, plus a words-per-minute display to encourage the budding typist! A unique feature is the double-size text option in both edit and printer mode ---perfect for young children and people with poor vision.

Database: You use this for storing information, just like an office filing cabinet. Facts you have entered can be quickly retrieved by just keying in a word or part of a word. They can be sorted, replaced, saved for future use or printed out.

Spreadsheet: Enables you to use your micro for home accounts or pocket money records. It creates a display of numbers in rows and columns. Continuous updating is possible, and a changed figure can be instantly reflected throughout the rest of the spreadsheet. Your results can be saved, to be used for future updates, or can be fed into its associated program ...

Graphics: Part of the spreadsheet section, it lets you draw bar charts, pie charts and histograms to give a graphic presentation of your statistics. Helps to give life and colour to the duller figures!

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- ☆ Database
- ☆ Graphics

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TO ORDER PLEASE USE THE FORM ON PAGE 45

This handy utility by Julie Boswell will help you to keep a wary eye on your finances

It isn't an easy task managing your finances these days. Keeping track of standing orders, direct debits, cheques, credit cards and so on is quite a headache – especially when you can't get to the bank as often as you would like.

To overcome this difficulty and help reduce increasing bank charges here is a program designed to enable you to store all your financial transactions in your micro – Home Finance Manager. You can type in dates, details, credits and debits and it will display the last 20 transactions entered.

The new balance will be calculated with each entry and if you become overdrawn this will be highlighted. The whole lot can be output to the printer to provide a statement.

First enter and save the listing. When you run it you'll be asked if you want to load a data file. The first time you use the program – or if you want to create a new file – you must press N. Now enter the date at the prompt and the opening balance.

The date should be entered like 15APR as you are restricted to five characters. If you are overdrawn enter the balance as a negative number. After typing in these items the screen should look something like the screen dump illustrated, except that you'll just have the opening balance. If you are overdrawn the balance will be printed with the colours inverted to highlight it.

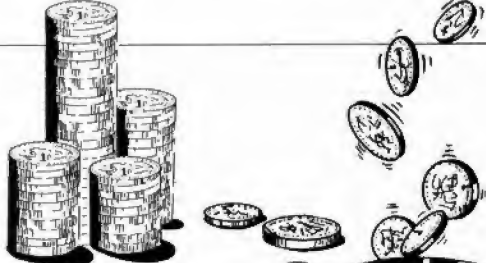
Four options are available to you: Enter next, Delete last, Print statement and Save file. Press E to enter a new transaction. Type the date at the prompt followed by a short description such as salary, mortgage, cheque 0123456 and so on.

Next you'll be asked to enter the debit or credit. Just enter the amount if it's a credit, but debits should be typed as negative numbers. Having done this it will be added to your statement and the new balance will be displayed.

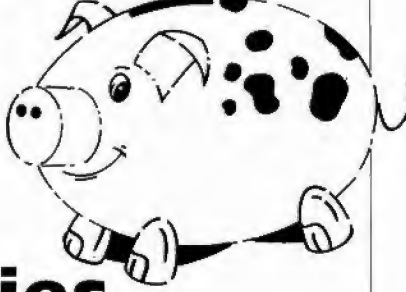
If you make a mistake during the entry procedure keep pressing Return until you are back at the main screen and then press D to delete the last transaction.

If you want a hard copy of your statement press P (or Print) on the main screen – make sure your printer is connected and on line. The final option is to save all the data to disc or tape. Press S to do so.

Next time you run Home Finance Manager



Look after the pennies...



PROCEDURES

initialise	Set up the arrays
display	Print the statement on screen
enter	Enter a new transaction
save	Save the data
load	Load the data
insert	Make space for more entries
print	Output the statement to the printer

VARIABLES

last	Last item entered
option\$	Option chosen
date\$(20)	Dates
detail\$(20)	Details
dc(20)	Debits and credits
balance(20)	Balance
ts	Program title

press Y when asked if you want to load the data file – or N if you want to create a new one, say, for a different account – and you can continue where you left off.

The program stores the last 20 transactions, and if the screen becomes full the first entry will be lost and the others will be shuffled up to create space for the next one.

One point to be wary of is the DFS Can't extend error message which can crop up when saving the data file – tape and ADFS owners won't get this error. To avoid it you could use a blank disc to save to, or ensure there is enough space allocated on the disc by *SAVEing a 16k chunk of memory with the name HFMdata.

** Home Finance Manager **

Date	Details	D/C	Balance
12RN	Opening balance	8.88	385.52
07RN	Mortgage	-285.21	100.31
12RN	Rates	-6.41	93.90
06RN	Salary	64.21	158.11
06RN	Cheque #15342	-188.88	-35.77
06RN	Gift	-12.80	-48.57
06RN	Mortgage	-285.30	-376.87
12RN	Rates	-6.41	-383.28
06RN	Cheque #15343	-58.88	-442.16
28RN	Salary	64.21	-377.95
08RN	Mortgage	-285.12	-663.07
12RN	Rates	-57.25	-720.32

(Enter next (D)delete last
(P)rint statement (S)ave file?

```

30 ts="Home Finance Manager"
20 RM By Julie Boswell
10 RM (c) Electron User
40 NICE 4
50 HFCinitialise
60 HFRMC
70 HFCdisplay
80 HFRMC 198(0,20) "Home Fin. M"
else last
90 HFRMC 198(0,20) "Print statement"
c 80ms 2187;
100 option=CHR$(GET CR 32)

```

```

110 W0 7
120 IF option="w" HFCinitialise
130 IF option="p" last=last+(last-1)
)
140 IF option="p" HFCprint
150 UNIL option="w"
160 HFRMC
170 END
180
190 DEF PROCsave
200 CS
210 HFRMC 198(0,5) "Saving data...";

```

```

220 HFRMCINIT
230 FILE=CHR$(GET CR) "Details"
240 HFRMCFILE, last
250 FOR i=4 TO last
260 HFRMCFILE, dc(i), detail$(i), d
c(i), balance(i)
270 NEXT
280 CLOSEFILE
290 HFRMC "Data saved...";
300 HFRMC
310

```

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```

320 DEF BPOCLOC
330 OPEN L
340 PRINT:PRINT
350 FILE=OPEN "BIBDATA"
360 INPUT:IN, last:
370 FOR I=1 TO last:
380 INPUT:IN, date$(1), detail$(1), d
c(1), balance(1)
390 NEXT I
400 CLOSE:IN
410 INPUT:IN
420
430 DEF BPOCInitialise
440 IF=0:GOTO 4
450 FOR I=1 TO 4, 0:
460 DIM date$(20), detail$(20), d(20)
, balance(20)
470 PRINT:PRINT(0, 5) TO
480 PRINT " "
490 PRINT:PRINT(0, 10) "Load data files?"
/
500 IF CHR$(GET OR C2)=Y: BPOCLOC:
INPUT:IN
510 PRINT:PRINT(0, 12);
520 INPUT "Enter today's date (eg.10
JUN): " date$(1)
530 date$(1)=CHR$(date$(1), 5)
540 detail$(1)="Opening balance"
550 PRINT:
560 INPUT "Enter opening balance:" ba
lance(1)
570 last=4
580 INPUT:IN
    
```

```

590
600 DEF BPOCprint:
610 CLS
620 FOR I=1 TO last:
630 PRINT:PRINT(0, 1) "date:" date$(I)
640 PRINT:PRINT(0, 2) "detail:" detail$(I)
650 PRINT:PRINT(0, 3) "balance:" balance(I)
660 PRINT:PRINT(0, 4) " "
670 FOR I=1 TO last:
680 PRINT:PRINT(0, 5) "date:" date$(I)
690 PRINT:PRINT(0, 6) "detail:" detail$(I)
700 PRINT:PRINT(0, 7) "balance:" balance(I)
710 NEXT I
720 INPUT:IN
730
740 DEF BPOCdisplay
750 CLS
760 PRINT:PRINT(0, 5) "date:" date$(I)
770 PRINT:PRINT(0, 6) "detail:" detail$(I)
780 PRINT:PRINT(0, 7) "balance:" balance(I)
790 FOR I=1 TO last:
800 PRINT:PRINT(0, 8) "date:" date$(I)
810 PRINT:PRINT(0, 9) "detail:" detail$(I)
820 PRINT:PRINT(0, 10) "balance:" balance(I)
830 NEXT I
840 PRINT:PRINT(0, 11) " "
850 PRINT:PRINT(0, 12) " "
860 PRINT:PRINT(0, 13) " "
870 PRINT:PRINT(0, 14) " "
880 PRINT:PRINT(0, 15) " "
890 PRINT:PRINT(0, 16) " "
900 PRINT:PRINT(0, 17) " "
910 PRINT:PRINT(0, 18) " "
920 PRINT:PRINT(0, 19) " "
930 PRINT:PRINT(0, 20) " "
940 PRINT:PRINT(0, 21) " "
950 PRINT:PRINT(0, 22) " "
960 PRINT:PRINT(0, 23) " "
970 PRINT:PRINT(0, 24) " "
980 PRINT:PRINT(0, 25) " "
990 PRINT:PRINT(0, 26) " "
    
```

```

3932
870 MORE 0,27*32+16:PRINT 1,1280,0
880 MORE 0,29*32+16:PRINT 1,1280,0
890 MORE 0,6*32+16:PRINT 1,1280,0
900 INPUT:IN
910
920 DEF BPOCprint:
930 PRINT:PRINT(0, 1)
940 IF last=0: BPOCInitialise:
950 FOR I=1 TO 30, 30, 26: CLS
960 INPUT "Enter date (eg.10JUN): " date$(last)
970 PRINT:
980 date$(last)=CHR$(date$(last), 5)
990 INPUT "Enter details:" detail$(last)
date$(last)
1000 PRINT:
1010 detail$(last)=CHR$(detail$(last), 1)
, 17)
1020 INPUT "Enter detail/credit:" d(1)
date$(last)
1030 balance(last)=balance(last-1)+d(1)
date$(last)
1040 FOR I=2 TO 30, 30, 26, 12, 26
1050 INPUT:IN
1060
1070 DEF BPOCprint:
1080 FOR I=2 TO 30:
1090 date$(I-1)=date$(I)
1100 detail$(I-1)=detail$(I)
1110 d(1)=d(1)+d(1)
1120 balance(I-1)=balance(I)
1130 NEXT I
1140 last=30
1150 INPUT:IN
    
```

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Adventures

By Pendragon

Rain is cascading against the battlements as I sit here poring over the slower of mail that has arrived at the castle since last we spoke. The most amazing news for Electron adventurers comes from a new development company called Foxboro Operating Peripherals. This Stateside firm has released a new add-on for the Electron known as Dungeon Users Personality Extractor, a conversion of a utility that has long been available to 16 bit micro adventures.

Available as a hardware board containing an operating rom and a battery-backed ram chip, Dupe - as it is being commonly called in the States - opens up a whole new world to Electron text adventurers.

Key in the *CLONE command and Dupe asks you a series of 98 personality questions. Answer each one in no more than 52 characters and the device builds up a personality profile of you. Once this simple task is completed the data is

Adventurer's Glossary

Umbrella: To stop things falling on your head.

Underground passages: They will need exploring and mapping, but make sure you take a light source.

Underground pool: Fill your bucket or bottle here. Swim with care.

Underwater: Swim down and explore. However, you will need breathing apparatus, or will need to hold your breath for short periods.

Unicorn: Follow it and catch it if you can.

Valerian: Required for certain spells.

Vampire: Needs a tasty steak, a clove of garlic or some daylight.

Velvet glove: Try wearing it.

Village: Often in an adventure. It needs thorough exploring.

Vine: You can try picking the fruit, though climbing it may be a better idea.

Violin: Try playing it.

Volcano: It will need climbing and perhaps entering.

Volcanic rock: Take care, it may be hot! Once cool it is an extremely hard material.

Voodoo doll: Needed to perform magic rituals.

stored in the ram chip and you are ready to experience for yourself the wonders of modern technology.

Before loading any text adventure on your Electron type in *ME than CHAIN or *RUN the game in the usual way. Dupe will enter your personality profile and will alter the way you, the hero, play and also alter mobile and game response to your actions - you never know, you may even get a princess proposing to you.

The outcome is that it changes the way each adventure plays with each individual - it can pose more problems but also create a lot of excitement. Obviously Dupe works better with more highly developed games such as Myorem, but it also performs quite well within Quilled adventures.

I have tried this utility with most of my text adventures and have experienced no incompatibility. However, I did face one problem when playing Lord of the Rings. When I tried to change character from Frodo to Sam in mid-game the system couldn't cope with dual personalities and the game hung up on me with the screen response *SCHIZO.

I rang Foxboro Operating Peripherals and they explained that this command refers to an upgrade - working title: Foxboro Overriding Organiser Link - which is still under development. It should be available for the Electron in

The ultimate e

about a year's time.

On a different front, another software company, Fox Soft Adventures of 1 Sycamore Close, Barnfields, Newtown, Powys, has released three new and original text adventures for the Electron at prices yet to be announced.

The first is *The Mathews Murder*, which I have been playing regularly during the past month. Despite some appalling spelling mistakes on my pre-production copy - these are now being ironed out - the game is infinitely playable and well designed.

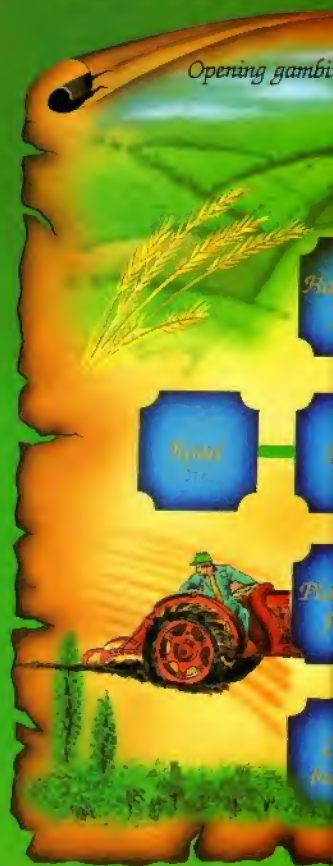
Mathews Murder owes a lot to the Agatha Christie Whodunnit genre as you try to uncover who has murdered the richest lady in the village of Tuttleberry.

Its second game, *The Golden Wombat*, in-



volves a schoolboy's quest to rescue a stolen religious artefact. And the third adventure called *I Spy Red* concerns a mission into America where a XGB spy has to rescue a nuclear scientist.

I must also take time to thank Ray Bray of Stockport for his most concise solution to *Robico's Blood of the Mutineers*, which enables



The Ket Trilogy



2nd floor
of
wash house

Seven coins
Map



Shop

Potion
Axe
Lamp

Wash
house



Chain

Lane

To field

electron
user



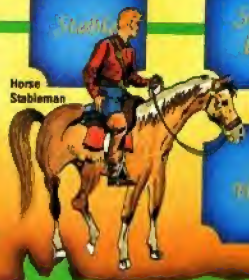
Basic
house



Stable

Smith
lane

Horse
Stableman



Wood

(Chop logs)
Log



go trip

me to help readers with their queries about this game. A bundle of adventures are now winging their way to Ray.

Thanks also to Barbara Gibb for her offer of a solution to Riverdale's howler Aussie Suds. This is a game which I have still to complete, having only played the first two parts of the adventure on a pre-production release.

Finally, this month's map is of the opening scenario in part one of Incentive's The Ket Trilogy. This should help many adventurers who are stuck at the outset of this oddity of a game. Next month I continue this series of maps with a guide to the openings to Rick Hanson.

◆ Until the Treasure store runs bare, happy adventuring.

This month I am sidestepping in order to give a little help with coping with parsers and vocabulary. In the early days of Electron text adventures a parser was likely to only accept two words of command at a time, inevitably a verb followed by a noun.

This caused unnecessary difficulties for adventurers, particularly as restricted parsers went arm in arm with limited vocabulary. For instance even if you knew the correct action to solve a particular situation, finding the right pair of words to carry out that action could be a nightmare.

I can remember spending days struggling with Potters' Staff of Law trying to extract two coins from a glass jar. I tried various combinations of GET COINS, TAKE COINS, GET MONEY and so on, with no luck. Eventually I discovered that the parser would only accept the command GET COIN (without an S) twice.

Problems Solved

Such limitations are unnecessary and frustrating.

Now advanced programming and text compression have extended artificial intelligence and more recent adventures such as Village of Lost Souls and Blood of the Mutineers allow multiple command statements.

These modern parsers allow quite complex actions such as: TAKE ALL BUT THE GREEN PEN, OPEN THE BOOK, PUT IT ON THE DESK AND WRITE IN RED INK. The use of the com-

Turn to Page 40 ▶

Readers Hall of Fame

Kingdom of Hamil - Mike Campbell

This solution involves help with specific sections of the adventures rather than a step-by-step audit trail.

The Lost World. You have to remain on the move at least 32 times before daring to descend

to the plateau. The problem is that you are being pursued by a Tyrannosaurus Rex which begins only four steps behind you, so hesitation is disastrous.

There are a number of ways to solve this problem and this is only one of them: North, North

East, South, East, South, East, South, West, South, West, South, West, North, East, North, West, South, West, North, North, East, East, East, South, West, South, East, North, West, Down. Then take the bust of Sir Arthur Conan Doyle, go West, take the whistle and drop down to where you started.

The Snark Tunnels: In order to solve this maze you must look at the mural on the wall, remember that Marco Polo went East, Scott went South, Columbus went West and Peary went North.

The forest and hinterland: Three treasures to find and three different puzzles. First go South and South East and drop the egg then return North West and North and Wait.

Now travel South and South East and throw water on the baby dragon. Then go East and retrieve Shakespeare's first folio. Travel West and South West, eat the cheese before going South to dream of Adric - a giant statue which you can now instruct Home.

Proceed North and North West before venturing into the enchanted maize. In the maize it is essential that you keep returning to pick up the oblivion talisman or the wicked spirits will get you.

At the entrance move West, East, South East, South West, West, South East and East then pick up the Van Gogh painting and return North East, South East, North West, North West, North East, North and West. Totally illogical!

◀ From Page 39

mands ALL and IT certainly saves wear and tear on tired fingers, but ironically enough the occasions you need to use such powerful and complex commands turn out to be far more infrequent than you might think.

In fact most adventurers fall back on the old fashioned verb-noun command even when playing a game that permits greater sophistication of input. Old habits die hard!

What follows is not intended to be a comprehensive list of parser terms, but should be sufficient to enable you to cope with most situations. It is basically a short glossary of the most commonly used verbs in adventures, together with some examples of respective and usually acceptable synonyms.

Break: Smash, bend, hit, cut, destroy

Close: Shut

Dig: Excavate

Drink: Sip, taste, consume

Drop: Remove, leave, put, free, release, lower, empty

Eat: Consume, taste

Examine: Search, look, inspect

Fill: Input

Fire: Shoot

Get: Take, grab, remove

Give: Offer

Go: Move, run, walk, travel, climb, ascend, descend, follow, swim, dive, enter, leave, fly, mount

Hit: Attack, kill

Kiss

Knock: Tap

Light: Burn

Make: Build

Open: Unlock

Point: Aim

Push: Pull, slide, move, tug, lift, raise

Read: Study

Show: Display

Sit: Down

Stand: Up

Talk: Say, ask, tell, converse

Turn: Operate, start, stop, press, switch

Wait: Rest, sleep

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- Counting:** Keep count of Kicker Kangaroo's goal scoring
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- Patterns:** Spot the highest flower an exercise in visual perception.
- Tallest:** and much, much more...

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Right answers bring a Cheshire Cat grinning from the screen, who quickly steps in to help the child in difficulty.

Cheshire Cat **ADDER SUMS** includes:-

- Multiplication:** Calculate the cost of items shown in the grocer's shop window.
- Addition:** Correctly total the shopping bill from the grocer
- Division:** Share out the biscuits using the simple technique provided.
- Time:** Learn to tell the time of day, days of the week and the months of the year.
- Tables:** Make a start or improve on those important times tables.

Sum Takeaway (Maths Level 2) Age 6-7 yrs.

Nineteen flexible exercise programs of games for up to four children are contained on twin cassettes or disk programmed for your home computer.

Each child's name is entered at the start and a complete record of results kept. All games can be set at two ability levels with up to 100 games for each exercise.

Right answers bring a Cheshire Cat grinning from the screen, a correct tick and a happy tune. Wrong answer and the program gives the unsuccessful child extra help.

Cheshire Cat **Sum-Takeaway** includes:-

- Addition:** Full hello to sums.
- Subtraction:** Starts with differences and introduces Take Away.
- Charts:** Ways of recording information. A vital concept in the child's future.
- Tens & Units:** Delightful visual hello to numbers over nine.
- Multiply:** First step in those times tables and the 'X' sign.

Sum Measure Age 9-13 yrs.

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Cheshire Cat **SUM MEASURE** includes:-

- Length:** Work out the length of a line in centimetres or millimetres.
- Area:** Find the area of a rectangle using cm^2 .
- Volume:** Give the volume of a cuboid in cm^3 .
- Temperature:** Work out the temperature shown on the thermometer.
- Mass:** Read the correct balance scale
- Capacity:** Measure the amount of liquid in the cylinder.

Sum Times (Maths Level 4) Age 8-9 yrs.

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Right answers bring a Cheshire Cat grinning from the screen, a correct tick and a happy tune. Wrong answer and the program gives the unsuccessful child extra help.

Cheshire Cat **Sum Times** includes:-

- Tally & Bar Charts:** An easy introduction to graphs.
- Time:** A moving clock for digital time.
- Tens & Units:** Addition & Subtraction of numbers over nine.
- Symmetry:** Lines of symmetry.
- Co-ordinates:** important for reading maps and graphs.
- Square Units:** Invaluable for calculating areas etc.
- and much, much more...

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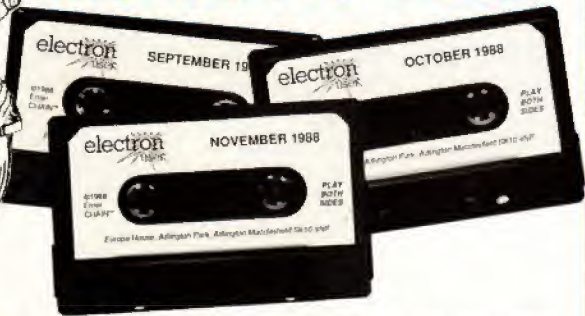
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Julie Boswell figures she knows all the palindromic answers...

```

10 REM Numeric palindromes
20 REM By Julie Boswell
30 REM (c) Electron User
40 MODE 6:PRINT
50 VDU 19,0,4:0:
60 PRINT
70 PRINT "Numeric palindromes..."
80 A%=1
90 REPEAT
100 IF FNtest(A%) IF FNtest(A%A%) P
PRINT A%:":A%A%
110 A%=A%+1
120 UNTIL FALSE
130
140 DEF FNtest(N%)
150 n%=STR$(N)
160 I%=1
170 REPEAT
180 P%=(MID$(n,I,1)+MID$(n,IEN(n)
)+I-I,1)
190 I%=I+1
200 UNTIL I%>LEN(n)/DIV2 OR P%=FALSE
210 =P%
    
```

Program I

```

10 REM Numeric Palindromes
20 REM By Julie Boswell
30 REM (c) Electron User
40 MODE 6:PRINT
50 VDU 19,0,4:0:
60 PRINT
70 PRINT "Numeric palindromes..."
80 DIM num% 51
90 DIM sq% 51
100 PRINT
110 INPUT "Enter start number:"n%
120 PRINT
130 Snum%=STR$(n) (50-LEN(n)), "0")
n%
140 FOR I%=0 TO 49
150 num%I%=num%I+48
160 NEXT
170 TIME=0
180 REPEAT
200 IF FNtest(num%) PROCsq:P%
FNtest(sq%) PROCpal
210 PROCinc
220 UNTIL FALSE
230 END
240
250 DEF PROCpal
270 PRINT "Number=":
280 PROCprint(num%)
290 PRINT "Square=":
300 PROCprint(sq%)
310 "%=TIME DIV 100
320 PRINT: "% DIV 60:" mins "%: "% MCD
60:" secs"
330 PRINT
340 ENDPROC
350
360 DEF PROCinc
370 P%=num%+49
380 C%=0
390 REPEAT
400 P%+P%+1
410 IF P%>9 P%+0:C%+1 ELSE
C%+0
420 P%+1
    
```

MATHEMATICS is a fascinating subject full of beauty – although memories of your school days may colour your view. We saw one example of this in the *Electron User* of May 1987 – with the Mandelbrot set. Calculated using a mathematical formula, it can produce amazing graphic images when a computer is used to plot the points on the screen.

A quite different type of beauty can be seen in numbers themselves. You have probably seen palindromes – words or phrases that read the same when read backwards, like MUM and MADAM. You can also have palindromic numbers as well, like 121 and 10201. These two numbers are in fact special palindromic numbers whose squares are also palindromes. The square of 121 is 14641, and 10201 squared is 104060401. Most interesting of all is the square of 11111 which is the number 123454321.

These special numbers are rare and tracking them down is quite a challenge to the mathematician. Many hours of computer processing time has gone into calculating and printing them out. One of the largest special palindromic numbers I have seen is 101010101, but there are even bigger ones than this waiting to be discovered. All you need is an Electron and a short Basic program...

The technique is quite simple: Take any number and test it to see if it is a palindrome, if it is then square it and test this too. If both are palindromes then print them out.

Program I shows how this translates into a Basic listing. All you need to do is type it in, run it, then sit back and watch it calculate the palindromes.

If you leave the program running for an hour or so it will stop with an error report. There's nothing wrong with the listing. The problem is that the Electron puts a limit on the size of numbers you can manipulate. The biggest one you can have (in hexadecimal) is &7FFFFFFF.

However, as we are squaring numbers in the program the biggest number we can test must be less than the square root of &7FFFFFFF. This is 46,340. So when the program tests 46,341 it stops with a *Too big error* message.

To find even larger palindromic numbers we must resort to a different technique, as clearly the Electron can't handle the maths. In Program II I have solved this problem by writing my own maths routines. Two sections of memory are reserved as workspace – *num%* holds the number and *sq%* holds its square.

Each digit is stored in a separate byte and there is enough space for a number 50 digits long. The Electron doesn't recognise these numbers, so a specialised print procedure is required to display them on the screen. A long multiplication procedure squares the number. (I don't mean the procedure is long; remember doing long multiplication on paper in your early school years?).

All this makes the program very much slower, but the advantage is that you can handle numbers of any size. When run, Program II prompts you for a starting number. A good place would be where Program I reaches its limit and crashes out. Try starting at 46,340.

One word of warning: Large palindromes are few and far between, so leave your micro running and go and have a cup of tea while it works them out. Better still, leave it running overnight.

Rarer still are palindromic numbers whose square and cube are also palindromic. Program II can be adapted quite easily to calculate these, but I'll leave that brain teaser to you.

```

430 UNTIL C%=0
440 ENDPROC
450
460 DEF PROCprint(N%)
470 P%=N-1
480 REPEAT
490 P%+P%+1
500 UNTIL P%
510 REPEAT
520 VDU P%+48
530 P%+P%+1
540 UNTIL P%+600
550 PRINT
560 ENDPROC
570
580 DEF PROCsq:
590 sq%=(STR$(N) (50,CHR$(0)))
600 P%=num%
610 REPEAT
620 P%+P%+1
630 UNTIL P%
640 S%=P%
650 FOR P%=0% TO num%+49
660 N%=(sq%+P%*(num%+49
670 Q%=num%+49
680 C%=0
690 REPEAT
700 P%=(P%+P%+P%+Q%+C%
710 C%=(P% DIV 10
720 IF C%>9 P%+0:C%+1
730 Q%+1
740 N%+1
750 UNTIL Q%>9 AND C%>0
760 NEXT
770 ENDPROC
780
790 DEF FNtest(N%)
800 P%=N-1
810 REPEAT
820 P%+P%+1
830 UNTIL P%
840 Q%=(N%+49
850 REPEAT
860 P%=(P%+P%+Q%
870 P%+P%+1
880 Q%+1
890 UNTIL P%>Q% OR P%=FALSE
900 =P%
    
```

Osargs and osword are not resounding oaths. Roland Waddilove explains all in Part 6 of his disc systems series

In this series, which started way back in our November 1988 issue, we have explored a great number of machine code calls which use the disc operating system – both DFS and ADFS – directly. One class of call we haven't yet examined embodies the osargs routines.

Entry point for these calls is at &FFDA in the operating system rom and this jumps via the ARGSV vector at &214/&215 back to the os rom at &FF1E. A call is made to &FF51 which then switches in the disc rom and jumps to it via the extended vector in page &0D.

Most of the facilities are fairly straightforward. The first one we'll look at can be used to detect the currently-selected filing system. It asks: Are you using the rom, tape, DFS or ADFS filing system at the moment?

The call is made with the A and Y registers set to zero and the result is a code number which is returned in the A register. This result tells you the filing system:

- 0 = No filing system
- 1 = 1200 baud cassette
- 2 = 300 baud cassette
- 3 = Rom filing system
- 4 = Disc filing system
- 5 = Econet
- 6 = Telesoftware system
- 8 = Advanced disc filing system

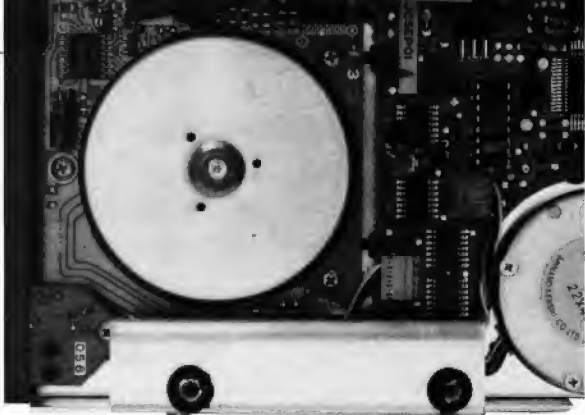
As you can see from this list, some of the filing systems aren't available on the Electron, so you won't get the full range of codes. You should see a result of either one, three, four or eight.

To see how this is implemented take a look at Program 1. Only five machine code instructions are required for this call. The first two set the A and Y registers to zero and the third calls osargs. The result code is stored in &70 and the program returns to Basic.

This call is particularly useful in programs which depend on a particular filing system being in operation. For instance, you can't open more than one file at a time with the tape system, but you can with the ADFS and DFS, so it is wise to check which is currently selected.

The second call we'll look at gets the address of any parameters passed when you *RUN a machine code program. Program 2 shows how this is implemented. What it does is to assemble a machine code program into the character definition buffer at &C00 – we're not defining any characters so this area of memory will be free to be used as we wish – and then save it to disc with the filename SOUND.

Enter it and run it. To test it first press



It's a matter of routine

Control+G to make a beep sound through the Electron's internal speaker. Now type:

*SOUND OFF

and try pressing Control+G again. This time there should be silence. And after:

*SOUND ON

you should be able to hear the beep again.

The Electron hasn't got a built in *SOUND command so how does this work? Any pure machine code program stored on disc can be run by simply preceding its filename with a star. Program 1 saves the machine code with the name SOUND, so when you enter *SOUND at the keyboard the program is automatically loaded and run.

The first task the code performs is to call osargs to find where in memory the rest of

the text is following the *SOUND command. Having got the address, the letters are checked and the machine code equivalent of *FX210,0 is executed if ON is found, and *FX210,1 if OFF is found.

The osargs call requires the A register to be set to one, the Y register to zero and X points to a two byte block of memory in zero page. After the call the address of the text following the star command is stored in the block. It is then an easy matter to scan the text to see whether ON or OFF has been typed. You could use the same technique to implement a wide range of additional star commands.

The remaining osargs calls aren't quite as useful as the first two, as we have seen earlier calls that do similar or even identical tasks. Osargs with the A register set to &FF and Y to zero updates all open files – it writes to disc any bytes remaining in the file buffer in memory.

Osargs with A equal to one or zero with a file handle in Y reads or writes the value of PTR# respectively. Finally osargs with A equal to two, Y equal to the file handle and X pointing to a control block, reads the length of a file.

Osword functions

The only remaining DFS – not ADFS – calls to look at are the osword functions. We have in fact seen one of them already – I used an osword &7F call to read sectors off a disc when we examined the DFS directory structure last month. Many more commands are available and we'll take a brief look at some of the more important and useful ones.

The simplest operation we can perform is

```

10 REM Get filing system
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 MCEE 6
50 IP=&900
60 osargs=&FFDA
70 [
80 LDA #0
90 STX
100 JSR osargs
110 SDA 470
120 PDS
130 ]
140 CALL 6900
150 PRINT
160 IF %70=1 PRINT "Tape";
170 IF %70=3 PRINT "Rom";
180 IF %70=4 PRINT "DFS";
190 IF %70=6 PRINT "ADFS";
200 PRINT "filing system selected"

```

Program 1

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to read the number of times a DFS disc has been written to. The osword call is &7D with the X and Y registers pointing to the address at which to store the result. Program III shows how this can be written.

With just two modifications to this listing we can also read the number of sectors on

the disc. The osword function number is &7E and the result is four bytes long instead of one. Try it and see.

Remember to reserve four bytes in result and print out the four bytes in your PRINT statement.

● I'll leave you with that teaser to ponder over. Next month we will examine some of the more complex osword &7F calls.

```

10 REM *COMINGS
20 REM By R.A.Maddilove
30 REM (c) Electron User
40 MCEE 6
50 csword=&7E7D
60 cobyte=&7FF4
70 address=&70
80 FOR pass=0 TO 2 STEP 2
90 P=&C00
100 [ OPT pass
110 LDA #1
120 LDX #&70
130 LDY #0
140 JSR csword
150 LDY #0
160 LDA (address),Y
170 CMP #ASC"O" \letter O?
180 BEQ ok
190 RTS
200 .ok
210 INY
    
```

```

220 LDA (address),Y
230 CMP #ASC"N" \letter N?
240 BNE off
250 LDA #210 \assume *SOUND ON
260 LDX #0
270 LDY #0
280 JMP cobyte
290 .off
300 LDA #210 \assume *SOUND OFF
310 LDX #1
320 LDY #0
330 JMP cobyte
340 ]
350 NDC?
360 OSCILL SWAVE SOUND C00 "+STR0-PS
370 PRINT TAB(0,5) \letter: "SOUND ON"
380 PRINT TAB(0,7) \letter: "SOUND OFF"
390 PRINT TAB(0,9) \to turn the sound
    on and off?
    
```

Program II

```

10 REM Read times disc written to
20 REM By R.A.Maddilove
30 REM (c) Electron User
40
50 MCEE 6
60 csword=&7FF4
70 FOR pass=0 TO 2 STEP 2
80 P=&A00
90 [ OPT pass
100
110 LDA #&7D
120 LDX #result MCD 256
130 LDY #result DIV 256
140 JSR csword
150 RTS
160
170 .result EQU 0
180
190 ]
200 NDC?
210
220 PRINT
230 PRINT "Insert disc and hit a key"
"
240 dummy=GET
250 CALL 6900
260 PRINT
270 PRINT "This disc has been"
280 PRINT "written to ":"result:" ti
mes"
    
```

Program III

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MICRO MESSAGES

Machine code breakthrough

I HAVE just discovered such an incredibly simple way of writing machine code programs that I don't know why anyone hasn't thought of it before. As you are probably aware, the Electron's 6502 microprocessor can only understand 6502 machine code. Whenever you run a Basic program it is interpreted by the Basic rom, and what happens is that each program line is converted into machine code, stored temporarily in memory, and then executed.

The reason Basic programs run much slower than machine code ones is that each line in the listing has to be interpreted - converted - every time it is executed. However, I have written an interrupt-driven utility that checks a running program to see when a complete line has been converted into machine code and then copies it to a safe area of ram.

When the program has finished running, or you press Escape, the machine code program is saved to tape or disc. Next time you want to run the program all you have to do is load and run the machine code version - of course, with the fantastic speed benefits of 6502 code.

This utility means that fast arcade games like Pac Man, Space Invaders and even Repton can be written in Basic and converted into machine code automati-

```
10 REM Basic -> Machine code
20 P=6000
30 READ a$
40 IF a$="END" THEN INK 160
50 P+=VAL("6"+a$)
60 P+=P+1
70 GOTO 30
80 DATA 08,48,8A,48,98,48
90 DATA CE,1F,09,00,00,A2,00
100 DATA ED,20,09,10,06,20,E3,FF
110 DATA E8,D0,1F,68,A8,68,AA,68
120 DATA 28,60,00,16,06,00,00
130 DATA 41,70,72,69,6C,20,46
140 DATA 6F,6F,6C,21,00,00
150 DATA END
160 74220=0:74221=9
170 PRINT 4,4
```

cally. I am tempted to send this off to a software company for marketing, but I think Repton Infinity's game creator uses the same technique. If this is true would it cause copyright problems? - **Lirpa Loop, Delhi, India.**

● Repton Infinity uses a completely different method so there aren't any copyright problems. However, now you have revealed the technique to thousands of Electron User readers we doubt whether you'll be able to sell enough cassettes to make it worthwhile marketing on its own.

Scoring points with Exile

I THINK Superior Software's Exile is great. At first I had difficulty getting underground, but I now know how. There is a competition which asks you to write your highest score. I don't want to enter the contest, but could you tell me how to find out what my score is?

In the Pres advertisement it says AP34 interface. Does that include disc drives? Why has the Electron not got sequels to games like Star Wars and Football Manager while other computers have? - **John Tweedie, Castlemilk, Glasgow.**

● The procedure for accessing the status

screen in Exile is very strange indeed, but it is well documented in the manual (at the top of Page 20).

Play the game as usual, then when you have had enough press Shift+9 and wait for a few seconds. Now press Control+Break and reload the game from the start. When the menu screen is displayed you can press 1 to access the status screen which shows your score, time spent playing, contents of your pockets, energy level, fuel and so on.

From the menu you can also save your current position or reload one saved on separate tape, plus a number of other useful functions. Page 19 in the manual explains each option.

It goes against the grain to press

Control+Break to save your position, as this command appears to wipe memory and destroy the game. However, it is stored safely away in some corner of ram that isn't touched by the Electron's reset operation, and the game loader checks this area for a saved game when it is run.

Adverts for disc interfaces do not include the drives unless they specifically say so. A drive will cost upwards of £80. It's true, some games haven't got sequels, but there should be enough incarnations of Repton to keep you going for some time to come.

Long live the Electron!

I WOULD like some advice for a computer ignorant mum. A few years ago when my son was at primary school I bought an Acorn Electron for him. I couldn't afford a BBC Micro, which was used in school at the time, but went for the cheaper Electron which was similar and on which he could still do school computer projects.

However, he is now older and would like to update his Electron - and there the problems start. To begin with there are no games available in our local shops. OK, in Electron User there are companies selling games, but he already has the vast majority on offer, and they are not the new games available for the Spectrum, Commodore and Atari which his friends have. Are these modern games available, and if so, where?

My son now feels that his Electron is useless. We cannot get any advice in Chelmsford as the shops are not interested, and anyway no one sells Electrons. Can you give me some advice as to how to upgrade this computer and where my son can buy some of the new games. Or is he right in saying that we would be better off to sell his Electron and buy another computer? - **Christine Papworth, Chelmsford, Essex.**

● The dilemma of either upgrading your Electron or selling it and buying a new computer is one we get asked about fairly frequently, and it's difficult to answer. Our advice is that if money is no object then by all means buy a new micro - the Atari ST is a good choice - but unless you're loaded stick with the good old Electron.

Take the Atari ST, for instance. The cheapest model will cost you well over £300, and the games cost around £20 each - some even more. If you buy just 10 games it will set you

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back at least £200. So that adds up to a minimum of £500.

Once you've got this you'll want to upgrade with monitors and disc drives – again, very expensive. We're not knocking the Atari ST, in fact, one of our sister publications is *Atari ST User*, but the point is that it's not a cheap micro by any means.

Conversely, the Electron is an inexpensive hobby. It has an abundance of software available from mail order companies for less than £5 and it won't cost an arm and a leg to upgrade.

It's true that many Atari, Commodore and Spectrum games aren't released on the Electron. However, just as many games released on the Electron aren't available on other micros. You can't get Repton, Clogger, Citadel, Palace of Magic and Pipeline to mention just five, on any other micro apart from the Electron's big brother, the BBC Micro.

As for upgrading your Electron, Pres and Slogger offer many hardware add-ons and utility rams that simply aren't available on any other micro. For instance, even the powerful Atari ST and Commodore Amiga haven't got battery-backed sideways ram cartridges!

Nothing but praise

I WOULD like to pass on my congratulations to Slogger for *Stop Press* which I use in school. I think it is far better than the fiddly-to-use and rather limited *Pixel Perfect*. Superior Software for Repton Infinity and Exile – both are brilliant, but it's a pity it has copy-righted all games written with Infinity, to Amstrad for the DMP 3250di – I now own one and wonder how I managed without it, and to the Impact Games Club for such a fast and reliable service.

Thanks for a brilliant and extremely helpful magazine. Keep up the good work. – Fraser McDonald, Dundee.

No match

I RECENTLY bought *Footballer of the Year* for the Electron and BBC Micro. It is good, but it also has a few bad points. As an Electron user I have to load side B of the tape. This is fine, but the game I play does not match up with the instructions. These tell me that there

are icons on the screen – but there aren't.

After all the buying and selling screens I am supposed to enter the arcade action screen, but all that I seem to be able to get is a black screen and a message asking me to shoot left or right. Also when I become tired of playing I can't save the game as there aren't any icons to choose this option. – Jonathan Willis, County Durham.

● It appears that this game is available for a range of micros, and unfortunately the instructions included in the Electron version are for another machine. There aren't any icons and there isn't an arcade sequence. The software is a text-only management type game.

Colourful characters

I HAVE had my Acorn Electron for two years. I used to play games all the time, but recently I have turned to programming and have got to the stage where I know how to define my own characters.

The problem is that I don't know how to define multi-coloured ones. How do you do this? – Mohammed Naveed, Burnley, Lancashire.

● There are several stages involved in printing a multi-coloured object. The first is to

```
10 REM Multi-coloured characters
20 MODE 5
30 REM Change colour 2 to green
40 VDU 19,2,0:0
50 REM Define green part
60 REM of character
70 VDU 23,224,126,255,255,231,36,0,
0,0
80 REM Define red part
90 REM of character
100 VDU 23,225,0,0,0,24,24,24,24,24
110 REM Print at graphics cursor
120 VDU 5
130 REM Move to position and
140 REM print green part
150 MOVE 200,200
160 GOTO 0,2
170 PRINT CHR$(224)
180 REM Move to position and
190 REM print red part
200 GOTO 0,1
210 MOVE 200,200
220 PRINT CHR$(225)
230 REM Print at text cursor
240 VDU 4
```

define a separate character for each colour. For a green and red object, define all the

green bits as one character and all the red bits as another.

Next you must use VDU 5 to enable the Electron to print characters at the graphics cursor. Set the colour with GCOL, move to the place you want the character displayed with MOVE and then print the green part. Carry out this procedure again with the red part. Finally, restore printing at the text cursor with VDU 4. The listing shows how this may be done.

Troubles with tape

HAVING been given an Acorn Electron with cassette recorder I find I have a small problem. It will load games, but having started trying to write a few short programs myself, when I type in SAVE "MYPROG" it records, but when I try to reload it afterwards, it won't load. I either get Locked, Data? or Block? error messages. Can you help? – Lea Hambridge, Didcot, Oxfordshire.

● Something is being recorded otherwise you wouldn't see the error messages, so it sounds as though you need to adjust the tone and volume controls on your cassette recorder.

If it has a manual record level setting try different volume levels when saving, starting at zero and working up and see if you can find a level at which your program loads reliably.

When loading a program, again try different volume levels, starting at the minimum. The tone control – if you have one – should be set to give as much treble as possible, but if this doesn't work, try other settings.

Power cut

WHILE looking through some copies of *The Micro User* I came across the first issue of *Electron User* – it was a pull-out. On reading this I found an advert for the Electron, it was then I realised that something was wrong with my Electron.

The woman in the top right hand picture on Page 10 is busy typing away, but her Electron isn't plugged in! For some reason mine won't work like that. Just think of the money I could save in electricity bills. – Carl Barry, Accrington, Lancashire.

Traversing the Tube

HAVING invested in a PMS 6502 second processor, I am slowly trying to find programs which have been legally written and run across the Tube.

Acornsoft's Database on 3.5in disc hangs up at the *Examine/Update* existing file operation. This is, of course, the most important section of the whole program. It seems inconceivable that Acornsoft should have

All programs printed in this issue are exact reproductions of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will

almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

coded this program illegally. Unfortunately, my limited skills are not sufficient to solve the problem.

The other sections all seem to run properly, so it appears that there should be a simple answer. — K. Henson, Lisvane, Cardiff.

● Quickly glancing through the listing, it looks as though the program makes assumptions about the memory map — certainly PAGE. It would probably be a major task to re-write the program and it's not worth it. Switch off the second processor before running the database and all will be well.

Unfortunately, the vast majority of programs are not legally written according to Acorn's programming guidelines. The only solution is to either re-write or develop the programs yourself from scratch.

Educational upgrade

I BOUGHT an Electron four years ago, but apart from playing a few games on it initially it has had no further use. I now find that I am looking to stimulate my daughters' interest in reading and I am aware that the Electron has educational programs.

As a beginner I would be grateful if you could direct me along the right path to upgrade my Electron to accept discs and any other items you think necessary. My daughters are aged six and nine and the Electron will be used for educational games. — J. Patten, Kirkwall, Orkney.

● You don't need a disc drive, or anything else for that matter, to be able to use educational software. All Electron software is available on tape, so all you need is your tape recorder.

Over the years we have published many superb educational games listings in Electron User. Also Fun School 2 is now available using the order form on Page 37.

Worn out by night life?

I HAVE owned an Electron for several years and am very pleased with it. However, I have a query that has puzzled me for some time. Two of my friends leave their Electron on overnight with apparently no ill effects. I don't do this, but it would be useful if I could.

My friends' computers have had a couple of problems which have been fixed. My two computers, one with a Master Ram Board, have had no trouble at all. Is this coincidence? Thanks for a colourful and informative magazine — I couldn't do without it. — Simon Podely, Kettering, Northamptonshire.

● It should be OK to leave your micro on all night providing you don't cover it up or put it next to a radiator or fire where it can overheat. The faults your friends experienced were probably coincidence.

Expanding those random thoughts

I AM in desperate need of help. I bought the February issue of Electron User and found that the article titled Random thoughts was very useful for a project I'm working on. The programs work well, but I need to store data such as names, addresses and paper deliveries instead of letters of the alphabet. Can you tell me how to create the records and then read and write them using the programs featured? — Carwyn Jones, Fareham, Hampshire.

● The basic idea is the same as outlined in the article, except that each record is several characters long, not just one. Instead of using BPUT and BGET to write and read individual bytes it is best to use PRINT and INPUT to deal with the whole strings.

Here is a very basic database program that allows you to enter names and store them on disc:

It prompts you to enter 10 names and stores each one on disc. Then you can type any record number in the range 1 to 10 and that name will be printed out. The file pointer, PTR#, should be incremented

by the record number times the record length.

Strings are always stored on disc preceded by an additional two bytes (which you never actually see). The record length is therefore two plus the maximum string length, in this case 22.

```
10 REM Simple database
20 MODE 6
30 PRINT
40 FILE=OPENOUT "Data"
50 FOR i=1 TO 10
60 INPUT "Enter name: ";n$
70 n$=LEFT$(n$,20)
80 PTR#FILE=PTR#22
90 PRINT#FILE,n$
100 NEXT
110
120 REPEAT
130 INPUT "Enter record number: ";r$
140 PTR#FILE=PTR#22+r$
150 PRINT#FILE,n$
160 PRINT "Name = ";n$
170 UNTIL FALSE
180 CLOSE#FILE
```

Broken link

I HAVE not been able to use my Electron for just over a year due to the fact that the lead from the cassette to the computer has broken. The wires have become disconnected at the computer end.

I have scoured local shops, but have not found any with a lead in stock. At the moment I am trying to find someone who can fix it, but I wondered if all shops have stopped stocking it? — Sarah Keene, Shoreham-by-Sea, Sussex.

● All Acorn dealers should be able to supply a cassette lead. If you can't find one nearby contact Watford Electronics, Jessa House, 250 Lower High Street, Watford — they will be able to provide one.

A curse on that cursor

HAVING read the February issue of your magazine I would like to pass on a few thoughts of my own. I am pleased to see that Electron User is continuing to support our beloved Electron in such a positive fashion.

I feel the idea put forward by Peter Naylor for a swap shop or small ads column is a

good idea as people will have odds and ends which are surplus to requirements and which could be put to good use by other Electron users.

I use my Electron as the hub of my office as secretary of St. James' Bed Push Club which raises funds for various units within St. James' Hospital, Leeds, and also to check the draw numbers (approximately 1,780 entries) for a social club each week. I would like to see if anyone else has any interesting uses for their micros.

Lastly, as I still use a television, I would like to know if it is possible to change the shape of the cursor within View to possibly a large square as when searching 1,780 entries in Mode 0 and 3 the normal cursor sometimes takes a bit of finding. — Alan Fairburn, Leeds.

● Unfortunately, you can't alter the Electron's cursor in any way.

Football simulation

WILL CDS be releasing a follow-up to Brian Clough's Football Fortunes, possibly titled Brian Clough's Boxing? I think we should be told! — Martyn Amos, Newcastle-upon-Tyne.

● That's hitting below the belt!

Here's how you can get the very best out of your Electron

Within the pages of these three books you'll find ALL the information you need to fully harness the power of your Electron. They cover Basic, machine-code programming and the operating system, and between them they also show how to combine all three to create more powerful and effective programs.

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If only our Electron's Basic was faster. This forlorn hope has, perhaps, persuaded many a Basic programmer to abandon the charms of this ubiquitous language and set about unravelling the intricacies of machine code, which speeds up the Electron's graphics capability leading to programs exhibiting that quality look.

If you have ever considered making the change over to machine code but have been put off by assembly language listings which seem to bear no relation whatsoever to Basic, your excuse has just been terminated. For you will be surprised to learn that 6502 assembly language on the Electron can be directly related to Basic. A Basic program will often provide an ideal starting point for the development of a machine code equivalent.

Converting Basic

If you have ever made use of the Electron's VDU codes you will be aware of their ability to concisely emulate such commands as COLOUR, GCOL, MODE, PLOT, TAB and so on. Though VDU codes do not give rise to the most readable of listings, they do offer that first step when programming in assembly language - this being the set of mnemonics that your Electron will eventually convert into machine code.

Consider a situation where you want to write a program in Mode 1 establishing certain foreground graphic and text colours. Using Basic you would probably start with something like this:

```
10 REM Graphics Demo
20 MODE 1
30 GCOLOR,2
40 COLOUR 3
```

This is a perfectly adequate programming approach of course, but unfortunately it does

Francis Botto shows how to convert your programs from Basic to machine code

not relate to assembly language at all. Furthermore, there is no scope for direct conversion into an assembly language equivalent. A far better strategy is to break down all commands into their equivalent VDU codes, where the program would become:

```
10 REM Graphics Demo
20 VDU 22,1
30 VDU 18,0,2
40 VDU 17,3
```

Having achieved such a listing all you need do now is convert the codes into assembly language. To do this you must make use of the `oswrch`, or operating system write character, routine which resides at `&FEE`. It should be said that any VDU code can be written in assembly language by simply calling upon the `oswrch` routine using `JSR`.

So how about Program 1 as an assembly language equivalent? Well, it's long enough, and there are certainly enough `JSR oswrch` statements. In fact it is an assembly language equivalent of the most primitive kind, with numerous recurring statements.

```
10 REM Program 1
20 REM By Francis Botto
30 OSWRCH=&FEE
40 DIM MCS 1000
50 FOR opt=0 TO 2 STEP 2
60 P=MC3
70 GET opt%
80 assembly_language
90 LDA #22
100 JSR OSWRCH
110 LDA #1
120 JSR OSWRCH
130 VCODE 1
140 LDA #18
150 JSR OSWRCH
160 LDA #0
170 JSR OSWRCH
180 LDA #2
190 JSR OSWRCH
200 GCCLR 0,1
210 LDA #17
220 JSR OSWRCH
230 LDA #3
240 JSR OSWRCH
250 VCCOLR 3
260 RES
270 ]
280 NEXT opt%
290 CALL assembly_language
```

Program 1

However, take a look at the manner in which the VDU codes are represented. They are each loaded into the accumulator using the `LDA` mnemonic and then implemented by the ensuing `JSR oswrch` statement. To progress to a more satisfactory solution it is necessary to incorporate a loop structure together with an appropriate data area. This technique is adopted in Program II where the `X` register is the loop counter and the `EQU` statements store the data by reserving memory bytes.

To summarise the process of converting VDU codes into assembly language, con-

Turn to Page 54 ▶

A boost for Basic



◀ From Page 53

sider the steps taken to convert this program:

```
10 REM Graphics window
20 MODEL
30 GCOLOR,133
40 VDU 24,400;400;800;600;
50 CLG
```

Re-write it using VDU codes:

```
10 REM Graphics window
20 VDU 22,1
30 VDU 18,0,133
40 VDU 24,400;400;800;600;
50 VDU 16
```

Having reached this penultimate stage you

```
10 REM Program II
20 REM By Francis Botto
30 OSNRCH=OFFER
40 DIM MES 100
50 FOR rep#0 TO 2 STEP 2
60 P#4M#
70 [ OPT rap#
80 .assembly_language
90 LDK #0 \X w# = loop counter
100 .loop
110 LDA data_area,X \read data itm
120 JSR OSNRCH
```

Program II

can now substitute the codes into an assembly language program. There is no need to become involved with separating the 16 bit numbers making up the graphics window into separate bytes, as the oswrch routine will do this automatically. What you must do, however, is arrange the VDU codes in a suitable form. To learn how to do this, take a look at Program III. This is fairly straightforward, and being uncannily similar to Program II, its operation is also alike.

There is one slight difference, and that is the use of the EQUQ mnemonic which reserves a double word (or four bytes) of memory. It is also worth noting that data is read from right to left using the EQUQ statement. You are urged to take a close look at the manner in which data is listed as this will help when writing your own assembly lan-

```
130 INX \Increment loop counter
140 CP# #? \All data been read?
150 BNE Loop
160 RTS \Return to BASIC.
170
180 .data_area
190 EQUQ 22:EQUQ 1 \MODE 1
200 EQUQ 18:EQUQ 0:EQUQ 2 \GCOLOR,2
210 EQUQ 17:EQUQ 3 \COLOUR 3
220 ]
230 NEXT
240 CALL assembly_language
```

guage programs.

That just about covers the implementation of VDU codes in assembly language. Using the discussed stages, any such Basic program can be transformed.

```
10 REM Program III
20 REM By Francis Botto
30 OSNRCH=OFFER
40 DIM MES 100
50 FOR rep#0 TO 2 STEP 2
60 P#4M#
70 [ OPT rap#
80 .assembly_language
90 LDA #40 \X w# = loop counter
100 .loop
110 LDA data_area,X \read data
120 JSR OSNRCH
130 INX \Increment loop counter
140 CP# #15 \All data been read?
150 BNE Loop
160 RTS \Return to BASIC
170
180 .data_area
190 EQUQ 22:EQUQ 1 \MODE 1
200 EQUQ 18:EQUQ 0:EQUQ 133 \GCOLOR,0,133
210 EQUQ 24 \VDU 24,400;400;800;600;
220 EQUQ 400:EQUQ 400
230 EQUQ 800:EQUQ 600
240 EQUQ 16 \CLG
250 ]
260 NEXT
270 CALL assembly_language
```

Program III

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(The screen pictures show the BBC Micro version of the game.)

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